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THE

Dental Summary

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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

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No. 1

ORAL DIAGNOSIS*

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DURING THE PAST DECADE, medical and dental science has made it clear that if the dentist is to take his place in the conservation of health, a thorough and judicial diagnosis of oral diseases is more necessary at this time than it ever has been in the past. The days have gone by when the dentist's duty to the patient ceases with his looking for dental caries. The day has gone by when the layman and the physician will be satisfied with such an examination. It is a lamentable fact that in the examinations of the mouth as are usually made by the average dentist, the discovery of carious teeth is all that seems necessary; and in many cases, his examination is completed when the tooth surfaces have been explored. This kind of an examination seems to have been deemed sufficient and the dentist's responsibilities seem to have ceased when he had completed the necessary reparative work on the tooth structure.

Today we must have a different dentist, a dentist who must play a much larger role, a dentist whose responsibilities must not end until he can render a conscientious opinion that the mouth is not harboring lesions that will be detrimental to the individual's well-being. So, with these thoughts in mind, the writer desires to call attention to some of the factors which should go to make up a complete examination of such conditions of the mouth as will make dental service indispensable in the great field of health conservation. The writer desires to urge a very close co-operation between the dentist and the physician, without which a complete diagnosis of many conditions presented will not be possible.

The diagnosis of body ills and lesions is so far-reaching that one man or one group of men may not be sufficient in order to perfect it. The part that the dentist must play in a complete physical diagnosis is an important one and is becoming more important day by day as we realize the number of body ills that arise from mouth conditions. The

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role of oral infection and its relation to systemic disease is still in its infancy. While volumes have been written on this subject in the past decade, yet there must be an abundance of evidence that is still not determined and neither you nor I may live to see the day when the dentist and the physician shall have mastered the subject of infection.

Now, just what steps must constitute a judicial oral diagnosis? One of the weakest links in the chain of oral diagnosis in the past has been the failure on the part of the dentist to obtain a complete history of each case. We believe today that this feature of an examination is just as important as it is for the physician to obtain a complete history of his cases. In obtaining a history of a case, all of the factors bearing on present and past diseases should be considered. One of the first things that we should take into account is the age of the patient. Age has a most important influence as a predisposing factor to disease. There are certain diseases which a child may be subjected to; likewise, the adult. There are certain diseases that rarely occur before thirty-five or forty years of age. These diseases are usually the diseases which occur as a result of the lowering of the vitality of the individual. As an illustration, carcinoma of the mouth and tongue is rarely found in the mouths of individuals under forty years. Likewise children seem to be more immune to the sequela of oral focal infection than adults. Many other diseases seem to have an age selection.

Occupation is another factor that plays an important role in the causation of diseases. Occupation works in two ways: *first*, in subjecting the individual to certain deleterious influences; *second*, the conditions of life in which the occupations are carried on, such as ventilation, exposure to cold, excessive use of particular parts of the body, physical or mental exhaustion, deficient exercise, irregular feeding, etc.

Inquiry into hygienic conditions is another thing that should be included. One of the most common causes of disease is the lack of cleanliness. Many diseases in early childhood are due to unhygienic habits and living in unhygienic environments. The place of living, such as town or country, is important for us to know. Many of our patients living in the open air will be able to tolerate certain types of dental work which could not be tolerated by their brother or sister who has less opportunity for outdoor living.

The question of previous disease often predisposes to the same or other diseases and no clinical history is of value unless it includes an account of former illness. The very fact that if we have the knowledge that the patient has suffered from some disease leads us to think that this patient's vitality may not be up to par and our diagnosis may be varied accordingly. One of the most important questions which we may ask our patient, is that relative to diet. Food and drink, by their abuse may excite disease either by excessive food or by want of food. When a patient is referred for oral diagnosis where oral foci of infection

are suspected, we must not overlook the fact that the infection which is causing the systemic disturbance may have its origin in the gastrointestinal tract and may be set up and maintained by improper diet.

Habit is another important factor to look into in making a diagnosis. We should make inquiry as to the amount of exercise; as to the regularity of the meals; as to the body eliminating processes, etc.

Then we come down to the present illness. We should have a history of the present illness including the date and mode of onset. This may in itself enable us to form an opinion. Many times, a differential diagnosis may be made simply by getting the history of the beginning of the disease or illness. We should ascertain from the patient if possible, the cause of the present illness or their opinion as to the cause. This may bring out some points that may be very valuable. Then ascertain the course the disease has pursued. If a lesion in the mouth is present the course it has taken from time to time should be known. Then we should know what the treatment has been, if any, and what results have followed. This may give us considerable information not only as to the diagnosis of the case, but something that will aid us to govern our future treatment. Then we must elicit from the patient the most distressing symptoms for which relief is sought. All of these things are essential in ascertaining a complete history of the case without which a judicious diagnosis is not possible. In some cases all of this information may not seem essential, yet it is through the possession of such knowledge that we are able to arrive at a determination of the patient's physical resistance.

It cannot be too greatly emphasized that the resistance of the individual to disease must play a very important role in determining the character of dental treatment.

After obtaining the clinical history of the case our next step should be to make a thorough macroscopic survey of the whole mouth.

One of the sins of omission that is usually made in the examination of the mouth by the dentist is in not making a thorough examination of the mucous membrane. The dentist who makes a study of color of normal mucous membrane is able to distinguish the physiologic from the pathologic, and in this way many lesions will be discovered and treated in time to prevent serious disturbances to arise therefrom. It is the writer's opinion that gingival infection is playing as great if not a greater role in systemic diseases than apical infection. The gingival mucous membrane should be examined in every case for evidence of inflammation.

The tongue is an organ which frequently is overlooked by the dentist in making mouth examinations. The tongue may be considered a barometer, in many ways, of systemic disturbances. The tongue being an organ of extreme mobility, is frequently traumatised by rough fillings and rough surfaces of the teeth. In every single patient who comes to us for mouth examination, above the age of forty years, the



Fig. 1

Fig. 2

Fig. 1.—Mandibular third molar lying in inferior dental canal.

Fig. 2.—Mandibular third molar lying in mandibular foramen. (Cryer).



Fig. 3

Fig. 4

Fig. 3.—Inverted mandibular third molar erupting at base of mandible. (Cryer).

Fig. 4.—Hutchinson's teeth. (Dermatological Laboratory Univ. of Michigan).



Fig. 5

Fig. 6

Fig. 5.—Gumma of Tongue. (Dermatological Laboratory Univ. of Mich).

Fig. 6.—Gumma of Tongue.

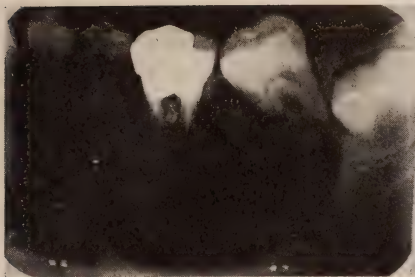


Fig. 7

Fig. 7.—Large simple cyst in child 12 years old.



Fig. 8

Fig. 8.—Large dentigerous cyst in young man of 18; showing destruction of large area of mandible. The etiologic factor is the mandibular third molar lying at base of cyst.



Fig. 9

Fig. 9.—Large dentigerous cyst with mandibular third molar as the etiologic factor. Lower illustration shows cross section of this tooth and in which the nerve pulp contains well-developed tooth structure both enamel and dentin.

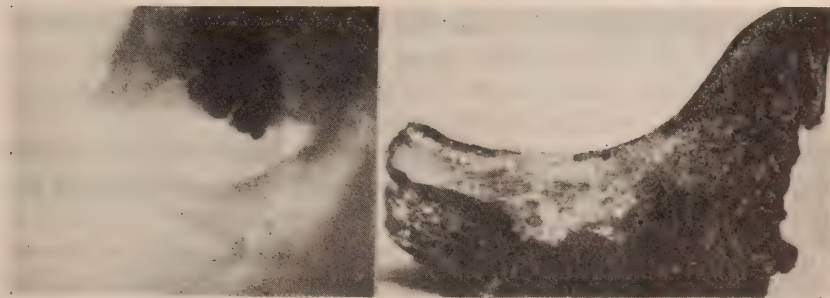


Fig. 10

Fig. 10.—Necrosis of the mandible. Illustration at right shows sequestrum. This condition followed attack of typhoid fever.

tongue should be examined for pathologic lesions. Usually in patients of this age, the teeth are abraded through years of mastication or are broken down by caries and present a fertile source for traumatic lesions of the tongue. Frequently we find on the surface of the tongue, various manifestations of traumatic origin. Many forms of stomatitis are found on the tongue. The tongue is frequently a site for syphilitic manifestations or of primary or secondary carcinoma. Many of these lesions may be eradicated if the patient can be directed early into proper channels. When we consider the far-reaching results of disease that are manifested on the tongue, then we can readily see that we are doing less than our duty to our patients when this important organ is not thoroughly explored as a matter of routine in making mouth examination.

Second to the tongue, the tonsils and pharynx should be thoroughly examined for primary or secondary lesions. These lesions can be detected only by familiarizing ourselves with the normal tonsils or pharynx; then when an abnormal condition is present, cooperation with a rhinologist is imperative.

In making a mouth examination, the salivary duct should not be overlooked. Sometimes the orifices of these ducts become occluded and serious consequences follow. Calcareous deposits may occlude these ducts and a salivary tumor result. Where these deposits are found radiography may help us to complete our diagnosis.

Next in importance is the examination of the salivary glands. Any of the salivary glands may become infected by the infection entering the gland through an open wound or the infection may follow down through the ducts; any obstruction to the duct would set up an inflammatory process. We should not overlook the fact that certain of the infective diseases; such as scarlet fever, typhoid fever, measles and meningitis, are frequently found or accompanied by parotitis. The reason that this becomes important to the dentist is the fact that in certain infections around the third molar teeth the parotid gland may become involved. It is sometimes very difficult to diagnose infections of the parotid gland, and this may be done only by obtaining a complete history of the present and past illness. One of the symptoms that is shown which may help us in diagnosing the case will be a diminution in the amount of saliva flowing from the gland. This is particularly true of the parotid gland where the glandular structure under these conditions is being replaced by fibrous tissue.

In the writer's opinion, all of these things should be examined before looking for dental caries, if dentistry as a profession is to take its place in the great problems of health.

In the examination of the teeth themselves, we should not be satisfied with simply a macroscopical examination. Many teeth which to the naked eye would seem to be normal, may have a pulp in the process of disintegration through gingival infection or through trauma, and may actually be infected, and this infection being carried to distant parts

of the body through the blood and lymph streams. Dr. Hartzell and others have shown that apparently live dental pulps under certain conditions may be infected. It is our belief that these pulps apparently may be alive, yet they are not normal and all the well-known tests, such as the electric current, thermal changes, percussion, transillumination, etc., should be used when they are suspected.

Making a judicial dental diagnosis is getting to be a very complex procedure on account of so many factors being involved. All of the skill and ingenuity of the operator is taxed to the utmost in working out a strong chain of evidence upon which he must base a definite decision. A clear interpretation by the dentist of the symptoms of the disease which he sees and of those described by the patient is of vital importance in making up this chain. Much of the evidence on which the dentist must base his decision is subtle in nature and cannot be taught in text-books; but must be obtained by close observation of the physiologic and pathologic condition of the tissues and by long experience. One of the advantages of the man with long experience over the younger man is the ability of the older man to grasp the essential details of the condition at once. It is true that the younger man today has the advantage over the older man in that he has been benefited by the teachings of laboratory experiments; yet the writer would like to take the stand that laboratory experiments have little value unless they can be backed up by clinical evidence. We believe that too much has been written recently based upon the foundation of laboratory experiments which in many instances cannot be backed up by clinical evidence. Laboratory experiments and clinical evidence should check if our investigations are to stand the crucial test.

Probably one of the greatest diagnostic aids that has ever been given to medicine and dentistry is the use of the X-ray. The Roentgenograph is indispensable in dental practice today, yet I think we are all agreed that it has been abused about as much as it has been correctly used. The writer would like to leave this message with the young men: Do not put all of your reliance on the Roentgenogram in making a diagnosis. It has been his observation that the best diagnosticians in both medicine and dentistry are those men who have been trained objectively and subjectively to differentiate the pathologic from the physio-psychologic. These men have arrived at this place only through close observation and experience. We must keep this point clearly in mind; the Roentgenogram is not the picture of the pathology but only a record of the shadows of the tissues. Just what causes the shadows we see in looking at the roentgenogram, we must determine by other evidence. There are three definite conditions which may cause a variation of density in the shadows of the human jaws. The first and probably the most common is the rarefaction caused by a pathologic involvement. The second may be traumatic as a result of undue stress or mechanical or chemical injury on the dental tissues.

The third may be anatomic, due to peculiarities in the bone itself of the particular individual.



Fig. 11

Fig. 11—Fibrous epulis.

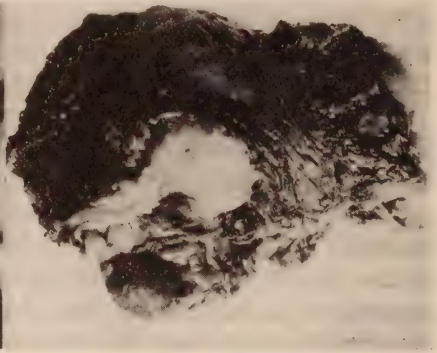


Fig. 12

Fig. 12—Osteo-sarcoma. This tumor followed an unsuccessful attempt for the removal of epulis.

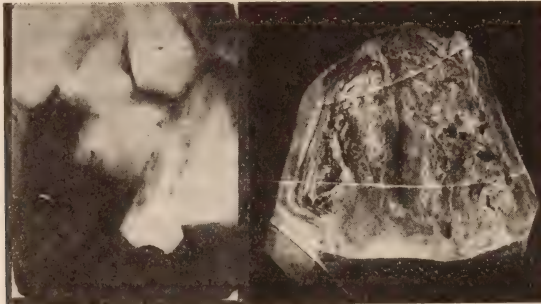


Fig. 13

Fig. 14

Fig. 13—Adamantoma of upper jaw.

Fig. 14—Inoperable carcinoma of upper jaw.

If we see the shadow of a tree made by the noon-day sun and do not see the tree itself, it will be difficult for us to determine without other evidence what kind of a tree it is that causes the shadow. So it is when we see shadows produced by the X-ray. Other evidence must be obtained before placing a definite interpretation upon them. The shadows that are recorded in a roentgenogram will depend somewhat upon the angle at which the roentgenogram is taken. This being true, I think we are all agreed that it is not sufficiently definite to wholly rely upon to make our diagnosis. It should be considered bad practice for a man to make a diagnosis from a roentgenogram without seeing the patient. He should insist upon having a complete history of the patient or better still, on seeing the patient and then instead of making a diagnosis from roentgenographic evidence, he should be able to see the individual rather than mouth conditions alone; then putting his roent-

geographic evidence together with all of the other evidence that he has, a judicial diagnosis may be made.

In the writer's judgment, there has been no one thing that has been abused more than the X-ray in the past decade, in that so many men have depended exclusively upon their X-ray findings in determining the indications and contra-indications in the extraction of teeth. The writer predicts that when the dental history of the past decade has been written, that the course which has been followed by certain men as a result of their entire dependence upon radiographic evidence will not be a great credit to the profession of dentistry.

The subject of diagnosis of focal infection has been covered so thoroughly and from so many angles by able men in the past that the writer does not deem that subject germane to this paper, but will take up a few of the other problems with which the dentists come in contact, and will endeavor to bring out some of the points of diagnosis. The first problem which he will take up will be that of obscure pain. This is a most perplexing problem and one which confronts the general practitioner very frequently in his daily practice. These pains are sometimes referred by lesions some distance from the point of manifestation. Except in patients suffering from neurasthenia, we rarely have pains about the jaws without some definite cause. When the cause is located, it will be found that an abnormal condition is present. These pains are sometimes spoken of as trigeminal neuralgia. Trigeminal neuralgia is not a disease *per se* but a sequela of a general or local disturbance yet, how many times do we see healthy teeth extracted in the endeavor to eliminate this perplexing disease! When a patient comes with what he terms neuralgia, we should endeavor if possible to locate the cause without which our treatment will avail nothing. If upon macroscopic examination of the mouth, nothing is revealed to us which will account for this obscure pain, we should not be satisfied that the source of the trouble is not there. Goldschieder, a German scientist, put forth a theory several years ago, that in the Gasserian ganglion, there are certain nerve cells performing a dual role. These cells have running from them through the different divisions of the trigeminal nerve, either split fibers or two separate nerve fibers. These fibers may terminate in any of the divisions of the nerve, so that the source of irritation may be in any region supplied by the nerve and through this peculiar arrangement may be felt in some other part, possibly supplied by one of the other divisions.

It is not an uncommon condition to find an irritation in the tonsillar region setting up odontalgia in some parts of the jaws. Thus we see the advantage of making a close examination of the tonsils in our mouth examinations. Probably one of the greatest sources of neuralgia are impacted and unerupted teeth. These teeth may be causing a pressure upon a nerve trunk, the irritation being carried to distant parts and manifested therein. Innumerable cases of headaches have been relieved

by removal of such irritations. Any derangement of nervous functions may produce the most unexpected consequences in the most unexpected places. With our present methods of nerve blocking, a definite diagnosis may be made by blocking off each section at a time and observing the results. Entirely too often teeth are sacrificed in the endeavor to give the patient relief because a definite and correct diagnosis had not been made.

Another type of this pain that frequently comes into the dental practice is epileptiform neuralgia or *ticdouloureux*. The practice of extracting teeth for this disease is so common that the large majority of patients suffering from *ticdouloureux* that are seen in the clinics at the University of Michigan have edentulous jaws.

Hutchinson says that: "Extraction of teeth in view of relieving epileptiform neuralgia is a pernicious and obnoxious practice. There exists no valid evidence to regard epileptiform neuralgia as of dental origin." Undoubtedly this affection is of central origin and the removal of the teeth will in no way be of any assistance in relief to the patient.

Among the types of pain with which the dentist comes in contact that is not of dental origin, yet which is manifested in the jaws, is that arising from an old syphilitic lesion. The mandible seems to be the region of selection for pain from syphilis of the heart and aorta. Several such cases have been presented to us in our clinics where the dentist in his enthusiasm to relieve the patient had extracted the teeth without results. Syphilis should always be thought of in running down obscure pain around the jaws.

Oral diagnosis should be of such a high order that teeth should not be sacrificed needlessly in the endeavor to relieve pain about the jaws, but we should go more into detail and endeavor if possible, to definitely ascertain the cause.

What is the dentist's responsibility today regarding the disease of syphilis? In the opinion of the writer, this disease, on account of its insidious progress with its far-reaching sequela, is a greater curse to mankind than tuberculosis. One of the assets of the World's War has been in the education of the public relative to this disease. When this disease is so prevalent today, when we know it is so easily transmitted to others, when in the presence of our knowledge of its far-reaching effects, is it sufficient for us when examining the mouths of patients simply to look for dental caries? Syphilis is due to infection with the *Spirochæta pallida*, and is transmitted only by contact; how easily it is to transmit this disease to the innocent by unclean instruments! A favorite site for the primary lesion or hard chancre is on the lip; it is also frequently found situated in the tonsillar region. In its incipient stages, it appears as a crack in the lip or an abrasion which is later destroyed by ulceration. These lesions usually are formed painlessly and indeed a knowledge of an abnormal condition may not be known to the patient.

Differential diagnosis of syphilis from other mouth lesions is not a simple matter. The clinical history of the case is not always reliable, for in the large majority of patients, the knowledge of the presence of venereal disease is denied. Perhaps today the most reliable test for this disease is the Wassermann reaction. While all cases will not give a positive reaction to the Wassermann, yet it is very rare that a positive reaction cannot be obtained in active syphilis. It is now a matter of routine in the majority of hospitals that this blood test be made of every patient who enters. In the examination of the mouth, any lesion with which we come in contact, that cannot be accounted for through dental disease, should be looked upon with the gravest suspicion. In the more suspicious cases, the dentist is justified in refusing to do dental work until a Wassermann test is made for the reason that this disease may be transmitted to the innocent. All of these lesions must be identified before discharging a patient. It is only by the strictest vigilance on the part of the practitioners in all branches of medicine that this disease may not get beyond control. Dentistry must do her part and this can be done only by a more careful survey of the whole mouth.

Another pathologic condition which a dentist may easily overlook when his attention is concentrated on dental caries only, is certain swellings about the jaws. In formulating the diagnosis of these cases, the first observation to make is to study their position. Through the position alone we are able to consider the diagnosis under four heads: *First*, those appearing to spring from gum tissue; *second*, those which may be situated over the alveolus; *third*, those involving the body of the mandible, and *fourth*, those involving the body of the maxilla. This, it will be readily observed, will include the tumors of the mouth and jaws. The subject of tumors itself is too extensive to be included in the subject of Oral Diagnosis. The writer will simply call attention to a few diagnostic points. The swellings which appear to come from the gum may be inflammatory hypertrophy. Such conditions result from any irritation of the mucous membrane such as calcareous deposits around the teeth. We more frequently find hypertrophy of the gums in children and its etiology may be found in pathologic dentition. Usually in these cases, we find it in any part of the gum tissue; it may be on either the palatal or buccal surfaces, depending upon the irritation.

The most common tumor of the gum is the epulis. In 167 cases, Scudder reports 49 in men and 118 in women, thus it would seem that women are more susceptible to these mouth tumors than men. While these tumors appear as springing from the gum, yet they have their origin in the pericemental tissues. They usually appear first as an enlargement of the dental papilla lying between two teeth. This increases slowly in size until they may separate the teeth. Fibrous epulis is ordinarily of small size and spreads out over the alveolus. It is smooth, quite firm, vascular, and does not bleed easily when

touched. The growth is very slow but as it becomes larger, the growth becomes more rapid.

We can diagnose these mouth tumors as epulis because they are always attached to a pediculated stock. These tumors are at first benign, and later, may take on malignancy. Surgical treatment should be instituted as soon as they are identified. The giant cell epulis can be differentiated from the fibrous epulis from the fact that it is softer and bleeds more easily. The giant cell epulis is the more common of the two and has a greater tendency to malignancy than does the fibrous epulis. When these tumors are found in the mouth we are doing less than our duty to our patients when we do not advise strongly that they be eradicated at once. They produce an irritation and we as dentists must keep clearly in mind that any prolonged irritation predisposes to malignancy.

Blair in his "Surgery of the Jaws," says: "Until the much desired cancer specific is discovered, it is mainly to the dentist grounded in Oral Pathology who makes a complete survey of the whole mouth that the medical profession and the public must look to reduce the now increasing death rate from cancer of the mouth." Dr. Joseph C. Bloodgood, of Baltimore who is a recognized author on malignant diseases, says: "From my observation the number of deaths resultant from cancer of the mouth is largely in the hands of the dental profession." He says further: "Since the American Society for Control of Cancer has been educating the public on the early signs of small lesions of the skin and mucous membrane which may ultimately develop into cancer, I have seen many hundred of patients with leukoplakia or white patches in the mouth and other small lesions of the lip, tongue and mouth, all of which are apparently due to smoking. The majority of these patients have been under the care of a dentist who although he has done the dental work well, has failed to recognize tobacco as the causative agent and has not advised his patients to stop smoking. The dental profession should know that when a smoker comes to them because of a painful or changed area of the mouth, the most important thing to do is to emphasize that tobacco in any form must be stopped at once and the teeth placed in perfect order."

When we consider the inevitable outcome of a malignant mouth tumor with its attendant horrors, not only to the victim but also to his family, and when we consider the improbability of the successful treatment of the case in advanced stages, then we can clearly see the advantage and importance of making an early diagnosis.

The swellings which involve the body of the mandible or maxilla may be either innocent tumors or malignant tumors. The most important matter is to recognize these tumors early which can only be done by a careful survey of the mouth of every patient. Let us repeat: Any prolonged irritation in the mouth predisposes to these malignant tumors.

The dentist has the opportunity of observing these swellings in their early stages and the medical profession today is placing the responsibility of early diagnosis of malignant diseases of the mouth on the dental profession. Any rough surfaces on the teeth which are producing a constant irritation should be removed. Leukoplakia is a forerunner of some of these tumors and is caused by excessive use of tobacco. It is characterized by the presence of white patches over the mucous membrane of the cheek and tongue. Leukoplakia in its incipiency causes little or no inconvenience to the patient, and many times the patient is not aware of any abnormal condition of the mouth unless it is called to his attention. If these growths continue until they become painful, we, invariably, have beginning of carcinomatous degeneration. In the diagnosis of pre-cancerous conditions of the mouth, we must keep in mind that there is no part of the body which is continually subjected to traumatism as are the mouth, the lips and tongue. We must not forget that a large number of patients present mouths with teeth that are broken down through the process of mastication, leaving knife-like sharp edges which abrade the soft tissues causing ulcerations which ultimately may result in malignant disease. All of these things must be taken into consideration in making a complete oral examination.

Another class of swellings observed by the dentists are those situated over the alveolus. In making the diagnosis in these cases, we should determine whether the swelling is fluid or solid. If we elicit fluctuations, it may be an abscess, either acute or chronic or it may be a cyst of the jaw. An acute abscess is quite easy to diagnose by its rapid history of a few days and always accompanied by the early signs of inflammation and symptoms of pain. The chronic abscess is sometimes more difficult to differentiate from a cyst than the acute. The chief points of distinction are in the history; that of the cyst being of slow growth while that of the abscess is one of rapid growth with variations in size. Sometimes the age of the patient may help in making the diagnosis of these fluid swellings over the alveolus. The dentigerous cyst is seldom seen in patients over thirty years of age. The diagnosis of the cyst may be made by aspiration using the hypodermic syringe for this purpose. If a fluid can be drawn from the cyst and this fluid is the color of amber, the diagnosis is clinched. The use of the X-ray on these swellings will sometimes make our diagnosis very definite. When a cyst is present the X-ray will show a definite cavity wall. If it is a dentigerous cyst, the X-ray will show in this cavity a tooth or the rudiments of a tooth. These cysts are always surrounded by a definite epithelial lining. The only solid swellings that originate in the alveolus are the rare solid odontome and the common exostosis of an inflammatory origin, often seen in individuals of a gouty diathesis.

In closing it may not be inappropriate to suggest that the highest aim of the dentist today should be not merely to be a good dentist but

to be a good dental diagnostician. If he is a good diagnostician he will be a good dentist. In the final analysis in the treatment of disease a sane, careful and complete diagnosis must always play the major role.

THE CLASP AS A MEANS OF ANCHORAGE— ITS USE AND ABUSE*

BY NORMAN B. NESBETT, D.M.D., BOSTON, MASS.

THE OLD SAYING, "There is nothing new under the sun," is clearly illustrated in the case of "the clasp." It is as old as dentistry, and yet today very much in the limelight. Nothing of great value however, concerning it appears in our literature until 1890, when an article by Dr. W. G. A. Bonwill, of Philadelphia, was published in the *International Dental Journal*. This article entitled "A New Method of Clasped Plates versus Bridgework," created much discussion in the dental ranks, and it is generally considered that the ideas advanced by Dr. Bonwill were discarded as being impractical. It would seem, however, that Dr. Bonwill was about thirty years ahead of his time, for let us read what he has to say in a review of the above article appearing in *The Items of Interest* for September, 1899, which by the way was the month and year of his death.

He writes: "After ten years, I am asked by many to revise and publish the results in my own practice of clasping human teeth. Of all I may have done in my unique and ultra systems or methods, this plan has filled a niche that would have remained a blank, for I would not have mutilated human teeth by capping for permanent bridging. So important has it grown in my own estimation, from seeing the criminal mutilation by bridging and final loss of teeth, that my voice is at highest pitch against this most cursed vandalism; and if dentists can be recalled from their mad career, duty again summons me to the front, to battle with this crime of bridging as now done by too many."

From the foregoing it can be seen that over thirty years ago the clasp was recognized as a valuable means of anchorage by the skilled prosthodontists of that period. And because no other appliance equally good has been brought out to supplant it, and because of justly growing caution that the dentist is using with regard to devitalizing teeth for anchorage, the clasp is being again largely used and, like everything else in dentistry, from cements to porcelain jacket restorations, is being somewhat *misused*.

Therefore, your essayist deems it important at this time to sound a warning concerning the careless indiscriminate use of the clasp, just as twenty-two years ago Dr. Bonwill sounded the warning against the

*The text in this article covers the subject matter of lectures given before the St. Louis Dental Society, March 1921, Conn. State Dental Association, April, 1921, Arkansas State Dental Society, May, 1921, Northern Ohio Dental Association, June, 1921.

careless indiscriminate use of fixed bridgework as it was even then practiced.

Diagnosis and proper indications for:

A—The Cast Clasp Bridge.

B—Removable Bridge with Clasp Anchorage.

C—Partial plate with Clasp Anchorage.

When, in 1916, the writer published in *Items of Interest* the article entitled "The Cast Clasp in Removable Bridgework," he hoped he had made it clear that the object of the special technic described was not just to *cast* a clasp, but to obtain an adequate attachment for a removable bridge. The title of the article, at least, would lead one to think so. Not so, however. The idea of making a clasp *to exactly fit the tooth* struck the popular fancy as a quick and easy way of making something that hitherto had been rather too difficult or impossible to consider. If, in the two years trial of the *cast* clasp prior to the first publication in dental literature in 1916, of any detailed technic on the subject, I had found it to be useful in *partial plates*, my findings would surely have been included in that article. That my position on this point may not again be misunderstood, I wish to go on record, as the originator of the cast clasp, as believing that it is, with few exceptions, the *least desirable form of clasp* to use in *partial plate cases*.

While the cast clasp, because of its low index of resiliency, is admirably adapted to removable bridgework, this very lack of resiliency makes it contra-indicated in partial plate-work. In fact, it is so frequently used where contra-indicated, that at the present time it has been freely predicted that the cast clasp is a "fad" and that we will hear very little of the cast clasp in a few years. One result I can predict with a certainty and that is that a large amount of tooth destruction under the clasps as they are generally placed will be observed within a few years. It is a sad but true commentary that about the only type of clasp the general practitioner of dentistry knows how to make or to order from the commercial laboratory, is the cast clasp, and he uses it on any and all occasions, whether indicated or not.

Time, with experience, levels all problems, even as history repeats itself. Between twenty and thirty years ago, many prosthetic workers knew how to make a proper fitting clasp and where to use it. Their cases succeeded, and as success begets imitation, clasps came into general use and misuse, until the day came, as it is surely coming again, when many dentists claimed to clasp a tooth was to doom that tooth. Our early Prosthodontists however, paid attention to a few factors that their imitators overlooked. In other words, they were good dental pathologists as well as good dental mechanics, as the word "prosthodontist" had not been coined at that time. These factors were kept strictly in mind: *First*, that a clasp, no matter how constructed, becomes dangerous in proportion to the amount of tooth surface covered; *second*, that a too perfectly-adapted clasp will invite disintegration

quicker than one touching at three or four points; and *third*, that correct relations must be established and maintained between the *clasp*, the *anchorage tooth*, and the *plate*.

The writer believes, and has found from experience, that the cast clasps made by the technic popularly used, are too wide, too closely adapted, and often of rough interior, and are doomed to fail because the very men using this most dangerous type of clasp—I am referring to the wide type of cast clasp—more often than not neglect to warn their patient that *all* clasps must be kept clean, or disintegration of the enamel and caries of the dentin will *surely result*.

The writer deems it important at this point to call attention to the fact that the technic of the cast clasp as first published by him, if followed, will result in a clasp of three-point contact, one at the occlusal rest, and two at the ends of the clasp arms, giving space for free circulation, consequent dilution of acids of fermentation, and less danger to underlying enamel structure.

PARTIAL DENTURE CONSTRUCTION

(Report of recent experimental work on lower partial artificial dentures, covering a method of obtaining a proper and lasting saddle support.)

It would be impossible in one lecture even to attempt to cover all the phases of partial denture construction. A tabulation recently published by Dr. W. E. Cummer, of Toronto, Canada, showed the total of 65,534 combinations of teeth present or absent in the two jaws.* The classification can be easily divided however, into two groups: Cast Clasp Removable Bridges and Partial Plates. One of the most puzzling questions of the day in dentistry is the management of partially-edentulous mouths.

Prosthodontists when asked what is the hardest puzzle of all, will almost unvaryingly name the lower partial case, with all the teeth missing posterior to the cuspid or first bicuspid. So this is the type of case that we will consider at this time. (*Fig. 1.*)



Fig. 1.

*See DENTAL SUMMARY, February, 1921.

About four years ago I began studies to try to arrive at a *practical* knowledge of the lower partial denture. The word, "Practical" is defined by the Century Dictionary as "relating or pertaining to action, practice or use; derived from experience; capable of being used or turned to account; contributing to one's material advantage; possessing utility; opposed to theoretical, speculative or ideal." So practical knowledge may be said to be "knowledge, the end of which is action." Action in this case was conducted along the following lines:

In order that we may intelligently discuss the problem of how to construct more efficient lower partial plates, we must first try to find why we have failed—in other words, etiology must be known in order to produce a remedy. Traumatic occlusion, or undue stress will cause resorption of alveolar process and bone around our natural teeth—the same causes will produce the resorption of the alveolar ridge under a lower partial denture. To be sure, these resorption changes vary greatly, according to the age of the patient, and in different patients of the same age, but were observed to take place in *all* cases where the ridge was exposed to traumatic stress. I will try to show that, as lower partial plates are usually constructed, the alveolar ridge is exposed from the start to traumatic stress and rapid resorption. Ultimate loss of occlusion and usefulness can be predicted with certainty. In fact, if we *wished* to *cause* resorption, the partial plates as generally constructed, would be the *best* instrument to accomplish that result. (Fig. 2 and Fig. 3.)

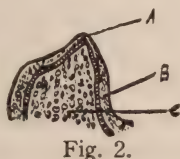


Fig. 2.

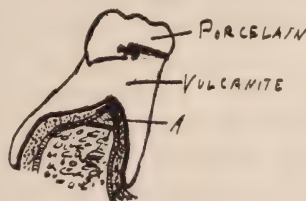


Fig. 3.

Fig. 2—Cross section of mandible at region between first and second molars. A and B shows comparative thickness of soft tissues over bone C.

Fig. 3—Cross section of mandible and vulcanite denture cut at first molar, showing even adaptation of denture usually obtained, resulting in over pressure and rapid resorption at A.

The problem on paper is one of great simplicity. It only remained to distribute the stress equally on all parts of the tissues covered by the saddles, and to cover as large an area as possible. Rebasings partial dentures is nothing new, but as usually done, the result is not ideal, because the top of the ridge usually is compressed too much. Taking relations of saddles and retaining devices, with the saddles under pressure, is better than nothing at all, but falls far short of the ideal results. The author's technic is as follows, and has been developed with these points in view:

First, that the saddles of a lower partial case must be depended upon to keep the denture in proper occlusal relation. This is not so

impossible as it might seem, as usually but one third of the area covered is utilized.

Second, that the attachments to the teeth be relied upon to keep the denture in proper position on the soft tissues, but cannot be expected to any great extent, to keep the denture from settling.

Third, that the entire structure be kept as simple and uncomplicated as possible, remembering that in Art, as in all things, the supreme excellence is simplicity. While the writer is fully aware that the last word on this subject is yet to be written, he can state that in his experience, he has tried and discarded spring-wire devices interposed between the clasp and the denture base. His observations have been that the dentures where these devices were used function in *spite* of such appendages and not *because* of them. He is willing to admit that if an operator insists on using cast clasps on lower partial dentures, and does not rebase his cases, that the sure outcome is the loss of the anchorage teeth. However, he does not use the cast clasp as anchorage for lower partial dentures, so avoids that trouble.

Fourth, that as large an area as possible be covered by the saddles, and that these saddles under masticating stress, should not cause traumatic pressure on *any* part of the alveolar ridge.

Bearing these points in mind, we proceed as follows: A sectional plaster impression of the lower jaw is made covering as much area as possible, paying especial attention not to bring any compression on any portion of the soft tissues, and to get sharp accurate impressions of the teeth to be used as anchorages. At the same sitting occlusal relations are taken, as is also an impression of the occlusal portions of the upper teeth. The pieces of the lower plaster impression are put together, and the teeth that are to be used as anchorages are packed with technic amalgam, with parallel tapered dowel pins, according to the author's technic used in cast-clasp bridgework. The two models are then occluded and mounted on an anatomical articulator. This becomes our working and study model, and with a model so developed, showing all the planes and angles of the teeth in correct relation one to another, the proper position for the clasps can be determined, as well as the kind of clasp to use. The lingual strap and the two clasps are next made and soldered together, and the resulting framework tried and stabilized on the model. It should be remembered that it is on this metal framework that reliance must be placed against heel lifting of a lower partial denture. If it will not stand this test at this time, it is reconstructed before we proceed to the next step. Incidentally, it is much easier to check up this detail on a correctly-constructed working model than it is in a patient's mouth. If the framework is found to be all right, the entire case is waxed up for vulcanization, removed from the model, flaked in Spence Plaster or Weinstein's Artificial Stone and vulcanized. As the case is to undergo another vulcanization later, this first vulcanization is not carried to the full hardness of the rubber.

After removing from the vulcanizer, it is cleaned and smoothed, placed back on the model, and the occlusion corrected, but left a little high. Up to this time the patient has been seen but once, you will note.

The patient is called in at this stage for the rebasing impression, and a careful digital examination of the ridge is made. This is extremely important, as the success of the next step hinges on it. The denture is next tried in the mouth, and the occlusion noted and corrected if necessary so that both sides strike with an even pressure, and the clasps left fairly easy, so that the denture can be inserted and removed without too much effort on the part of the operator. Then with a large 20-gauge vulcanite bur the under side of the vulcanite saddles are cut out in inverse proportion to the thickness of the soft tissues. In other words, cutting out deep, or to the extent sometimes of 4 mm. in the middle of the saddle, over the crest of the ridge tapering down to very little on the sides, and usually stopping the cutting at or about

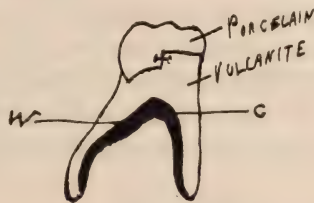


Fig. 4—Cross section at same point as at Fig. 3. Shaded area C represents amount of Vulcanite cut away from interior of plate. Note variable thickness of material cut away to accommodate wax show by W.

1-2 mm. from the border of the saddles. (Fig. 4.) Next black card wax, such as artificial teeth are carded on, or Dentsply Boxing Wax, which is the best material I have found for the purpose, is placed in the saddles, ("W," Fig. 4), the entire denture placed in water at 125° F. for a few seconds, placed in the mouth, and the patient allowed to close until the anterior teeth are seen to come together and the clasps are in proper position on the teeth.

This black wax is a low-heat wax which will not perceptibly chill or harden in the mouth, and under pressure and aided by the heat of the mouth, gradually spreads, compressing the tissues that are *easily* compressible, and yet it is too soft to either compress or bring under tension the thin tissue areas, such as are commonly found at the crest of the ridge. This same action cannot be obtained by using modelling compound as it chills too rapidly in thin sections, and will, in this semi-hard condition, exert too much compression. And also, because of its comparative hardness, it will not yield or compress itself enough to afford proper relief-bearing at the top of the ridge. Neither can this result be obtained as well by removing an *even* layer from the under surface of the vulcanite, ("W," Fig. 4), as advocated by some of our writers on this subject.

Many materials and waxes of different composition were tried in this experimental work, and the black boxing wax mentioned gives the best results in all cases. It is interesting to note that *too much* compression of the soft tissues can easily be obtained, especially with the use of modelling compound, and sore ridges with rapid resorption were the usual results where the patients were allowed to use the appliances.

The specific results obtained by the use under masticating stress of an uneven thickness of the black wax are hard to describe clearly, but can easily be demonstrated.

Before removing the appliance from the mouth the wax is chilled as much as possible to guard against distortion. In fact, the one great thing that makes it extremely hard to use is the danger of distortion while removing the appliance, and during the subsequent operations of completing the waxing and flasking for final vulcanization. If care is used, the outline of the buccal muscles, and the extent of the distolingual flanges of the plate, can be beautifully developed in the black wax, with the result that very little soreness will be experienced by the wearer. These sore areas so often experienced in ordinary cases, are, in my opinion, caused by the rocking or sliding of the plates rather than by direct pressure on the tissues. Some of the worst sore mouths seen in my experience have been under lower partial plates of very small area.

CONCLUSIONS

First, that a lower partial artificial denture in negative occlusion is a stop-gap and not a restoration, and should be restored to full occlusion.

Second, that efficient lower partial dentures can be constructed and kept in occlusion without rebasing as often as usually has been advocated.

Third, that 90 per cent. of reliance against settling must be placed on lower saddles and 10 per cent. on lug rests.

Fourth, that sufficient area has not usually been utilized *correctly* in most lower partial cases.

Fifth, that abutment or anchorage teeth will not be pulled out of position if proper clasps and proper tissue compression methods are used.

Sixth, that anchorage teeth will not be harmed if proper clasps, covering as small a tooth area as possible, are used.

Seventh, that spring attachments etc., are not necessary and only add to the difficulty of keeping the appliance in adjustment and repair.

Eighth, that, on account of both teeth and soft tissues to be considered in the making, the construction of an efficient lower partial plate is a much more exacting piece of work than a full lower denture. However, if properly designed and constructed, it is not, as is sometimes said, the first step towards a full denture.

The writer fully realizes that hardly any of this work is absolutely original, and that much of it is in direct contradiction to most of the recent literature on this same subject. It has reached the same stage that full denture prosthesis reached, not so many years ago, and he trusts that it will be thoroughly tried out and unified as full denture work has been.

You will perhaps observe that the writer has made no attempt to classify cases or tissue conditions, as that ground already has been adequately covered by others. Nor has he contributed anything new to our already overburdened dental nomenclature, preferring to keep to facts instead of indulging in fancies. Neither does he presume to say that these experiments and observations are the final word on the subject, but prefers to believe that they will act as a stimulation to others to carry on and perfect the work in which he has become so greatly interested.

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ROOT CANAL PROBLEMS*

BY EDOUARD M. HALL, D.D.S., KANSAS CITY, MO.

"Genius is one per cent. inspiration plus ninety-nine per cent. perspiration."

FOREWORD

"THE GENIUS OF THE FEW in any line of human activity has made progress possible. The balance of mankind are what they are in proportion as they are able to keep abreast of the progress that has set the pace for them. Not what they *could be*, or *might be*, but what they *must be* to remain in the race is the measure of the energy put forth by the mass of mankind."

How well do the above quotations apply to dentistry! Progress in many lines of dental practice has been so rapid in the last few years that every practitioner, who desires to give the best services to his patients must make radical changes in his methods.

The dentistry of today is no more the dentistry of yesterday than it will be the dentistry of tomorrow. By virtue of the immutable law of never-ending change, to which dentistry must conform, old things must pass away and the new must ever be taking their place. This does not mean that in reaching out for the new we should not preserve what is of value in the old. The accomplishments of today only emphasize the imperfections of yesterday. Perfection is unattainable; progress and development point the way, but each eminence gained only shows it farther beyond our reach.

The world does move and we by virtue of great effort are borne along upon the tide of human progress, or by inactivity are lost beneath

*The first of a series of articles, on Root Canal Problems, being written exclusively for THE DENTAL SUMMARY.

its surface. The human will can no more annihilate a single truth than it can perpetuate a false doctrine. Truth is immutable and eternal while theories are born to die by the law of the survival of the fittest; the majority are discarded as misfits when applied to stubborn facts, while an occasional one, by becoming an established truth, ceases longer to be a theory.

It requires no prophetic vision to see what will become of the dentist who fails to make use of every opportunity to inform himself along the lines of recently established truths. In the past, dentistry was largely a mechanical art and was chiefly concerned in the development of oral prosthesis; today it is recognized as a branch of the healing art because many systemic ailments baffle all the efforts of medicine and surgery until the mouth is restored to a healthful condition.

One who does intensive study and work along special lines is liable to become enamored of his own ideas. This I have earnestly tried to avoid and have made strenuous effort to keep my mind in a receptive attitude and open to new ideas. I don't want anything that I may say to cause you to think that I do not believe in laboratory and other lines of research, for they are very valuable and are necessary as a means of checking up on clinical work; but in the final analysis any procedure or technic will have to stand or fall according to clinical results obtained.

I want my position in this great question to be fully understood. I don't think for a single moment that I know the correct answer to *all* root-canal problems, and I don't believe anybody else does at this time; and ten, fifteen or twenty years from now we will know little more than we do today unless the work is systematized and hundreds of careful, intelligent, skilful men keep an accurately-tabulated series of clinical case records.

To give us proof for or against certain procedures or technic, deductions arrived at from X-ray studies of old defective root-canal work is not fair or just, because the work was done under what we now realize as very unfavorable conditions, where heroic, tissue-destroying drugs were used and sepsis was unknown.

We must make deductions from a mass of evidence from carefully-tabulated records of work done according to present standards of easily proven better methods.

I feel sure that every well-informed person believes that infections in and about the teeth are not to be ignored and should first of all be prevented in so far as far as it is within our power; and second, where they exist they should be overcome and eliminated or the teeth extracted. While many have gone to extremes on this question the vast majority of the profession are still doing root-canal work in much the same old way.

Since it takes a skilful operator several hours to complete a correct root-canal operation upon a single tooth, and we have comparatively, only a few men doing this, while the careless, indifferent operator can

mutilate several teeth in the same time and we have hundreds of dentists doing it, you can easily see where we are getting.

Any dental restoration, whatever its scope or however beautiful its execution, is a miserable failure if it harbors an alveolar infection. Correct root-canal work, therefore lies at the foundation of successful dental practice.

The general dental practitioner must be brought to realize that where root-canals are concerned the sum total of the service rendered his patients is no greater than his success in root-canal work.

Root-canal problems as outlined below will be discussed in subsequent articles, the first of which will be Diagnosis.

ROOT CANAL PROBLEMS

I. DIAGNOSIS

1 Mouth Survey

- (a) X-ray
- (b) Faradic Testing
- (c) Transillumination
- (d) Temperature Tests
- (e) Percussion
- (f) Sensitive Test

2 Health of Patient

- (a) Age
- (b) Vitality
- (c) Family History

3 Value of Each Tooth

- (a) For Restoration
- (b) For Aesthetics

4 Mouth Charting and Restoration Plan

II. THERAPEUTICS

1 Silver Reduction

2 Electro Ionization

3 Old "Classic" Remedies

4 Dakin-Carrel Group

III. TECHNIC

1 Instruments and Equipment

2 Sterilization of Instruments

3 Opening and Preparing Canals

- (a) Maintaining Asepsis
- (b) Care of Periapical Tissues

4 Filling Canals

- (a) Methods
- (b) Materials

STRESS*

BY F. W. FRAHM, A.B., PH. G., D.D.S., LOS ANGELES, CAL.

BEFORE TAKING UP the detailed discussion of stress, a word of warning should be spoken regarding the careless selection of abutment and pier teeth. No thinking and conscientious crown and bridge worker will use any teeth that are questionable or pathologically involved for abutments or piers in his bridge work. That is, he will not use any tooth in any span of the bridge where such a span does not have a movable union either medially or distally on the pier tooth. When a fixed union has been placed at both the pier and abutment tooth, the bridge is technically and physiologically a compound bridge made up of two or more sections with two abutments and one or two pier teeth.

When we are considering a fixed bridge for any case, every effort should be put forth to make it a simple bridge that will involve only one abutment as a fixed unit. No bridge should be extended from a section of one function into that of another, without providing for the same in some manner. Also, it is a serious matter to extend a fixed bridge from the one side of the arch to the other with a fixed union at both the abutment and pier teeth. The life and usefulness of such an appliance is very short and unsatisfactory.

When the selection of such pier teeth is being made, careful consideration should be given to the direction and kind of stress to which the bridge or its sections is to be subjected. It would be a poor piece of engineering to combine an abutment that is subjected to a degree of torsional stress with a pier or abutment that does not function in the same manner without making provisions for such requirements. Again, it would be considered poor practice to unite two teeth in a bridge that do not function the same, or have at least the principal function common to both, without making adequate provisions for breaking the strain of such stress.

When a bridge has to be made and the engineering problems are being considered, it should be planned in a manner that will provide for its functioning with the other individual units of mastication and still fulfil the functional requirements that are peculiar to its own one or more distinct sections. The amount and direction of stress that each abutment, pier, and pontic will be subjected to differs very decidedly with their location in the arch and also the natural arch itself. The type of construction for the maxillary arch must not be the same as a

*The second of a series of articles on Crown and Bridge-work being written exclusively for THE DENTAL SUMMARY.

similar position for the mandibular arch. The function of two such bridges may be somewhat similar but the kind and direction of stress is certainly not similar. To follow out the same general plan of engineering for anterior, lateral and posterior position would be inviting failure for both the retaining and supporting abutments, and courting disaster for the bridge.

We must recognize the fact that a bridge placed in an arch made up of several sections, each section functioning in its own way, and yet functioning in harmony with the other two sections, must be constructed in a manner that will enable it to function in the section or parts of sections where it is placed, without offering violence to any other part of the masticating machine.

We must also recognize the variations of strain and function that exist between bridges of the maxillary and mandibular positions. The treatment of similar positions in either of the two arches demands a different application of the principles of engineering. The all-wise Creator was mindful of these functions and the directions of stress when he designed the mandibular teeth, numbered and located the course of the roots in their position. For us to ignore these anatomical features and construct bridges with utter *disregard of their related positions and forms*, would limit the bridge in its function, and shorten its useful life by destroying the supporting structures. A large percentage of the failures of fixed and other bridge work is directly chargeable to a hasty consideration of the fundamentals, if not an ignorance of them. Another large per cent. of failures may be charged to the prevailing disregard of tooth forms as well as the function of the various surfaces and their peculiarities. This may be due to an unwillingness on the part of our workers to take up the study of reproducing such tooth forms, or it may be very hard for some to visualize such forms and then produce them in whatever material is being used. However, our success depends largely upon such knowledge and understanding. Whatever the reasons may be, an effort should be made by every crown-and-bridge-worker to reproduce the form of the teeth and re-establish the function of those parts that he is supplying with an artificial substitute.

For convenience in our work the arches may be divided into two lateral and one each, right and left anterior section. In *special* cases the anterior section may extend from cuspid to cuspid involving only the replacement of the *centrals* and *laterals*. The cuspids should not be included in the anterior or posterior sections, for their function is not common to either of these, but distinctive and characteristic of themselves. The first half of the lateral sides embraces only the bicuspid. Their function is different from the teeth anterior or posterior to them. They may, to some extent, be considered grinding teeth and to some extent tearing teeth, but their function is principally that of chopping or sectioning the food fibers. The second half of the lateral sides is made up of the three molars. The function of these three teeth is

wholly that of grinding, and differ very little from each other. The writer is of the opinion, however, that these three units differ in efficiency to the extent of the difference in the construction of their occlusal surface. If each one of the maxillary molars functioned like its neighbor, the detail of its architecture would also be the same. A casual look at the mandibular units of the second lateral half would soon convince the observer that there is a difference in function of the three units making up this section. These various functions will be considered at a time when the peculiar details of the occlusal surfaces is being discussed. However, it is quite right to call your attention at this time to the necessity of confining certain details of bridge engineering and construction to meet the needs of the section involved. If from any cause it becomes desirable to combine a part of two sections the function of the bridge units and the stress involved must be carefully considered.

The amount of stress to which our work may be subjected depends a great deal upon a changing environment. Racial influences must always be considered first. The modes of living, the kind of food and the degree of its preparation for mastication must be considered. The individual and his personal habits and peculiarities will largely influence the amount of stress that will be exerted upon our work. As a general rule the female of the race will exert less stress upon the teeth than the male. This may be due to the difference of muscular development, habit, and her natural delicate tendencies.

Health and occupational influences would make some very definite stress demands upon an appliance. The writer was asked to make a bridge for a man who made his living by hanging with his teeth from a aerial trolley that swung from one high building in one block to one not so high in another block. The stress in this case of course was not normal or physiological, nevertheless, it would have to be considered for this individual. There are many other forms of occupational stress that might be mentioned, but this one will suffice. There is the careless or thoughtless person who will subject our appliances to unusual strain by his carelessness. For example: A patient returned to our office six or seven months after the removable appliance had been placed in position and adjusted to the demands of the case, with a molar tooth broken out. Upon questioning her, it was learned that she had been cracking Iowa hickory nuts with the teeth, instead of using a hammer. She acknowledged that it may have been a foolish thing to do! However, the damage had been done. We can not always catalogue the do's and dont's for the patient that is wearing a fixed or removable bridge, and if we should we would not have the assurance that they would be observed. These two may be cases of unusual strain that are very destructive, but there are also many so-called normal strains due to stress that are just as destructive owing to the fact that they are constant and unrelenting. These factors of daily and hourly *stress*

will certainly wreck an appliance if they are not recognized and provision made for their relief.

The stress of occlusion is the least destructive and the simplest for which to provide. Occlusion is the static or passive relationship of the grinding surfaces of the teeth. It is not functional or active. This relationship of the teeth is rarely used during the act of mastication by a normal individual. There are very few conditions of inter-maxillary relationship that will not admit of some form of occlusion; however, such inter-maxillary relationship which will only admit of occlusion would be just as efficient during mastication as walking backwards would be to a man who is twenty miles from home with no other means of transportation than his two legs. A person may use only occluding stress and get nourishment but it will take a long time to thus prepare his food for digestion.

The stress of articulation, however, is a combination of forces that will wreck or injure an appliance that is not built in harmony with its demands. Articulation is an active or dynamic relationship of the occlusal surfaces of the teeth. It is the most constant, unconscious and beneficial relationship to which the teeth are subjected as well as the most trying and destructive. It is the least considered by the operator, because every individual has an articulation peculiar to that person, and because of the difficulty of its study and solution. However, the direction and amount of stress because of this individuality must be known to enable us to construct a bridge that will give reasonable service, without placing any unnatural strain upon the teeth that are involved in the retention.

The mandible is the only bone of our system that has two similar and yet distinctive articular surfaces. It is very positive and powerful in its function and yet it has much freedom in its movements.

However, with this freedom of action, there are some very definite restrictions in its functional movements. These restrictions function only in part, until the cusps of the teeth are approximated to form the rectangular groove on the working side. When the mandible has assumed this position, the arc or path through which the teeth sweep is very definite and in harmony with the anatomical construction and requirements of the masticating units of the individual. The writer needs only to call the attention of an observing and thinking man to the facets worn on the cusps and inclined planes of the teeth of either or both arches to help him to see that this normal wear, due to the fact that the mandible moves in harmony with very definite physical laws and the osseous framework is not a "Will o' the wisp" affair due to muscle activity. We are mindful of the influences and factors of muscle activity in the movements of any part of the body and especially that of the masticating unit, but to assume the theory that the cusps of the teeth are the controlling factors in the movements of the *mandible* is as deluding as it is comfortable. The writer would gladly embrace

this theory *if it would solve the problem*, but he must confess that it would place him in the same position as the ostrich who buries his head in the sand and then says to himself there is no danger near, because he does not see it.

The bridge-worker who ignores the physiological movements of the mandible and then attempts to force it to move in arcs that he has prescribed by a definite cusp arrangement, has opened the door to every influence and factor that would strain and destroy not only his work but also the unfortunate members that should articulate with the appliance. This theory cannot be too severely criticised and denounced for it is insidious and far-reaching in its scope. It has no clinical background to support it, and no physical, physiological or anatomical foundation upon which it can rest for even a season. The only real endorsement that it has, is the one of simplified method and easy application. The same for everybody and everybody the same. It seems to be the "ever ready", "just as good" method, the shot-gun prescription for all our troubles, but such illusions come high and there always is an awakening time for all real living beings. Allow me to appeal to every man to do some of his own observing and concluding, and not to be carried away by some catchy theory that has no scientific basis.

There are some inanimate, "man-made things" the movements of which are controlled to some extent with a disregard to God's laws. The rails may be the guiding factor for the direction a train shall travel. We may direct it around a curve by the use of flanges on the wheels and observing some laws of physics without a wreck, but never without wear and strain on the outside rail, and outside wheel flanges. But in the articulation and construction of substitutes for lost teeth we should not take such liberties without carefully considering every factor and force that is involved including the *muscle* strain. This expression is frequently used in conjunction with denture work, but it is just as applicable in all kinds of bridge work. However, I am not using it in the same sense, neither do I take in the same territory. If the piece of removable bridge work is extensive, the strain from this force must be very carefully considered. The stress of muscle strain that we should first consider is the strain that is placed upon the work by the clinching of the jaws in occlusion and articulation. This stress may be shifted first from one side to the other, and then exerted upon both sides. If you will bring your teeth into occlusion and then bite hard on the right side you will note that the teeth on the left are suffering a good deal less strain.

The variation of pressure by this method of biting can be accounted for by muscle activity and cushion-like construction of the temporo-mandibular articulation. Now, then, we will add to this strain the stress that is applied during articulation or active mastication. When the cusps and inclined planes that completed the rectangular groove,

are in the act of crushing the food content of the groove we multiply this stress several fold owing to the degree of inclination from which this stress comes. The suspension of the mandible and its relation to the maxilla either in En-harmosis, Ep-harmosis, or Pros-harmosis, or any modification of these, will also modify the stress that is due to muscle strain. Also, the personal habits of the patient will modify the strain. Some people do most of their chewing on the right side while others chew only on the left side, still others chew equally as much on both sides. These various strains frequently become of an aggravating nature, due to the nervous condition and habits of the patient. It may be a conscious or unconscious habit, nevertheless, the stress is there and must be accounted for if we would insure success for our bridges.

The direction from which the stress comes depends, to some extent, upon the development of the patient, as well as his peculiar habits of using this masticating machine. The incising function is usually an upward and distal movement of the mandible along the angle of the lingual surface inclination of the central incisors. However, there may be a slight variation of this movement due to the position of the cuspid. If the maxillary cuspid is in normal position, so the lingual-inclined planes of its cusp may pass through its notch between the mandibular cuspid and first bicuspid, the incising stress will have a slight lateral, distal and upward direction. The reduction function is entrusted to the bicuspids and molars. The stress upon these units is very similar; however, but the degree of stress and strain increases as we go distally in the arch. The direction of this stress is principally upward lingually and distally for the maxillary teeth, while it is medially, buccally and downward for the mandibular teeth. This accounts for the medio-lingual tipping of the second and third mandibular molars when the first has been extracted.

This division of stress automatically divides the arch on each side into three sections with the cuspid as the fulcrum or dividing tooth. Therefore, *it would be unwise to involve the teeth in two of these sections in one bridge without making adequate provisions for the breaking of the stress and equalizing the strain according to the function of each section in some acceptable manner.*

The amount of abuse to which our bridge-work will be subjected is as varying as the number of cases. It can be determined by an instrument made for the purpose, or it may be computed by having the patient bite into material known to have certain definite resistance to crushing stress.

The text matter of the next paper for discussion will be the Functional Anatomy of the Teeth.

Sixteenth and Los Angeles Sts.

ARRANGEMENT OF TEETH IN PARTIAL DENTURE
CONSTRUCTION*

BY A. ALFRED NELSON, D.D.S., DETROIT, MICH.

THE MERE FACT that partial dentures are retained in the mouth by means of retaining devices is no reason why the laws of leverage should be totally disregarded in the placement of the masticatory substitutes—the porcelain teeth. A little attention to and study of the direction of force as applied to the dentures is very beneficial and will be found a decided factor in the successful use of the denture. This detail can be worked out and studied on the mounted study models by erecting uprights in the shape of pins or wax strips at right angles to the center of the crest of the ridge. By noting the direction of these pins as related to the opposing ridge or teeth, knowledge that will be of great assistance in determining the position and inclination of the occlusal surfaces of the artificial teeth will be gained.

Often it is necessary for practical purposes to compromise between the opposing uprights to secure the best stabilization value, and still retain the proper direction of force. This may mean a cross-bite arrangement of the bicuspid and molars.

In a case of this kind, the method of procedure calls for a placing of the upper bicuspid and molars of one side on the opposite side in the lower jaw. In other words, the posterior teeth are crisscrossed. Wherever indicated it means the elimination of the first bicuspid in the lower jaw to produce a fine articulation.

One of the many bugbears of partial denture construction is the tendency of the denture to dislodge itself. Many men contend that this is due to the resiliency of the tissue and its desire to return to a state of rest when released from the stress of mastication; hence the rebound of the denture. I cannot subscribe to this theory, but on the contrary lend my support to the following:

Partial dentures are what they imply, i. e., restorations for partial edentulous mouths. The vast majority that are constructed are intended to supply substitutes for the lower bicuspid and molars.

When natural teeth are lost, those that usually go first are the lower first molars. The tongue having nothing to confine it laterally, becomes wide in this region with the result that when teeth as wide buccolingually as the natural teeth are inserted, the tongue does not have sufficient room within which to function, thus causing a dislodgment of the restoration. If molars, say a millimeter *narrower* than the natural

*The seventh of a series of articles on Partial Denture Construction being written exclusively for THE DENTAL SUMMARY.

ones are used, a greater degree of efficiency will result. This applies to the upper arch as well. The combination of Trubyte molds that will give good satisfaction are bicuspid mold No. 32L and molars mold No. 28L. This combination is very efficacious in full denture work as well.

In the selection of the anterior teeth for cases involving such restorations, it is essential that the size and shape of the teeth be in harmony with the face.

In arranging the anterior teeth, lapping or rotating the centrals and laterals will enhance the esthetics of the case.

The idea that all teeth in the same jaw must be placed contact to contact in artificial restoration is a fallacy. That is the ideal, but the ideal is the exception rather than the rule.

Please bear in mind that if necessity demands, then and only then is the full complement of bicuspid and molars necessary in either a full or a partial denture. Do not hesitate to space the teeth if necessity demands and if the laws of leverage will be enhanced by so doing. It is absolutely essential that the fullest masticating efficiency be restored in a restoration and this can only be accomplished by meeting the needs of the case.

213 Chalmers Bldg.



am not bound to win, but I am bound to be true. I am not bound to succeed, but I am bound to live up to what light I have, I must stand with anybody that stands right, stand with him while he is right and part with him when he goes wrong.

Abraham Lincoln

THE CAST "LINGUAL BAR"*

BY GEORGE L. ROTH, HARTFORD, CONN.

Copyright 1922 by George L. Roth.

"LINGUAL BAR" is the term applied to a not unimportant part of partial lower dentures replacing posterior teeth, the absence of which may make it necessary to depend upon the alveolar ridge for support. Its purpose is essentially structural. It serves to retain the supporting saddles and the retaining devices in their proper relation to each other. Passing behind and below the cervices of the anterior teeth it plays no part in retention, and modern practice condemns any upward extension to and upon the lingual surfaces of these teeth with the idea of obtaining additional support for the denture. It is generally agreed that a lingual bar must be sufficiently rigid to resist the strains to which the denture is normally exposed in the use and in the course of construction. It must not impinge upon the underlying soft tissues, and it must afford ample clearance for the muscular attachment of the tongue, but at the same time it must be sufficiently inconspicuous to avoid interfering with speech or mastication, or attracting the attention of a nervous patient when the mouth is at rest.

The modern casting process, combined with the resources of modern dental metallurgy, have supplied us with the means of making lingual bars which meet the above conditions as nearly as humanly possible. Indeed it may be truthfully asserted that no other type but the cast bar successfully fulfils them, and the fact that the cast bar is not more generally used, instead of the numerous slip-shod, uncomfortable, if not positively injurious expedients that are so commonly employed, is ample justification for dwelling upon what otherwise might be regarded as an elementary detail in partial denture construction.

We will begin with the consideration of the lingual bar for a denture with vulcanite saddles. A strip of surgical adhesive tape an inch wide is pressed down upon the model to cover the lingual surfaces of the anterior teeth and the soft tissue area below, being trimmed so that it will terminate at the margin of the vulcanite saddle areas. Lines are drawn upon the tape indicating the width and the location of the bar (*Fig. 1.*) Coconut oil is applied to the area outlined and to the surface of the model over the ridges one-half to three-fourths of an inch behind the posterior teeth on each side. A sheet of 28-gauge wax is pressed down to cover practically the whole of the upper surface of the model, so that it will adhere lightly to the ungreased areas, and the penciled outlines of the lingual bars will show clearly through it. (*Fig. 2.*)

*The first of a series of twelve descriptive articles illustrating some important phases of Bridge and Partial Denture Construction, being written exclusively for the Dental Summary.



Fig. 1

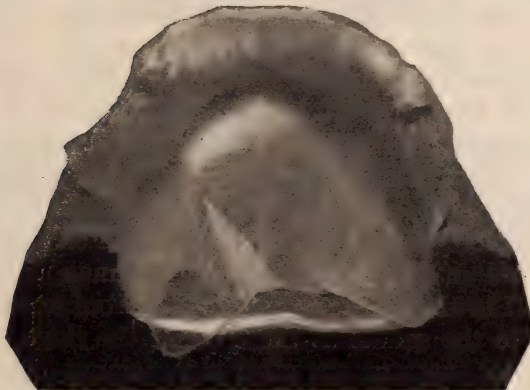


Fig. 2

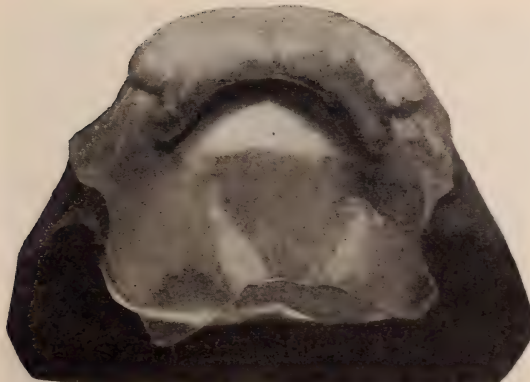


Fig. 3

Using a Dental Manufacturing Company "sprue gun," with the nozzle removed the exuded cord of wax is laid down upon the wax sheet. This cord will be about 10-gauge B & S and should extend one-fourth inch beyond the posterior teeth on each side, being placed just above the lower margin of the bar. (*Fig. 3.*) For this wax reinforcement the writer would suggest a mixture of half-and-half of Taggart's inlay wax and beeswax, or some soft base-plate wax, such as the Caulk's green. The mixture can be melted in a spoon and poured into the "sprue gun."

This reinforcing cord of wax is then sealed to place with inlay wax which can be melted and flowed so that the bar pattern is filled out to the visible penciled outlines, then trimmed to the desired thickness and shape. A reinforcement of inlay wax is also flowed over the ridge just behind the posterior teeth, forming a small saddle about one-half inch wide lingually, buccally, and about three-eighths inch long distally. The sheet of 28-gauge wax covering the model is then trimmed away, so that the ridges will be exposed. Fourteen-gauge Ney-Oro Elastic wire loops are shaped with the pliers, one-half to three-fourths of an inch long, and are heated and attached to the posterior borders of the small saddles, upon the lingual surface of the ridges. Between these loops, which are the vulcanite attachments, and the model there should be a space into which rubber can be forced, so that they will be completely imbedded in the vulcanite.

A straight rod of 17-gauge brass or German silver wire, from two and one-half to three inches long, is laid from one end of the bar, being attached to the saddle at the crest of the ridge, to a point just below the posterior tooth on the other side, joining together both ends of the wax pattern. (*Fig. 4.*)

The rest of the surplus 28-gauge wax is then trimmed away and the pattern is mounted upon the sprue former, using the wire as a sprue wire. (*Fig. 5.*)

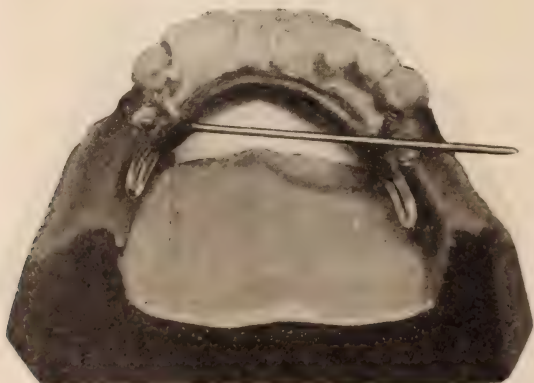


Fig. 4



Fig. 5

To cast the pattern in this way of course requires a long casting ring and in case such a ring is not available to the operator, another method is suggested for removing the pattern from the model without distortion. A thick mix of casting investment is poured upon the model which has been previously greased, so that it will just cover the bar pattern and the vulcanite attachment loops. When this has set, it can easily be removed and a short sprue of 17-gauge wire inserted in the center of the pattern. This method will enable the operator to use a casting ring that is relatively wide and short. (*Fig. 6.*)



Fig. 6

The casting should be made in Ney-Oro F. This alloy is peculiarly adapted to a purpose of this kind. It is inadvisable to use any of the familiar cast-clasp golds. The Ney-Oro F has the same degree of strength and springiness as the Ney-Oro E and similar cast clasp golds, and in fact is an admirable material in itself for the cast clasp. Having a lower melting point, it can be melted in relatively large masses, without deterioration which is liable to occur in attempting to obtain a sufficiently fluid condition for casting, with an alloy of a higher melting point. The melting point of Ney-Oro F is 1835° Fahrenheit, about the same as that of 22K. gold. Consequently, subsequent soldering operations can be performed with ease with a high-fusing solder. The wire loops being picked up in the casting should be of Ney-Oro Elastic gold, or one with a similarly high melting point, 2100° Fahr., or else there will be some danger of disintegration of the alloy when it meets the molten Ney-Oro F entering the mold. The loops being picked up in the casting will obviate the necessity of investment for soldering in place. It is necessary, however, for the union between the wire and the cast alloy to be made perfect by flowing a little 22K. solder at the point.

After the bar has been cast (*Fig. 7*), the sprue button and connecting strip can be removed, the bar dressed down and fitted upon the model. It is then ready for the attachment of clasps. In seating the bar it is wise to keep the adhesive tape upon the model.

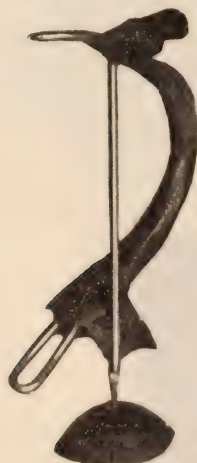


Fig. 7



Fig. 8

Fig. 8 shows the trimmed and partly finished bar and clasps in position ready for assemblage with solder. Precautions must, of course, be taken to sustain accurate relationship between the parts when removing from the model for investment. The subject of assemblage for soldering operations will be discussed in detail in a subsequent article.

The advantages of this method of making a lingual bar are obvious. The formation of the wax pattern takes little more time than is required to explain the details of operation. The location of the bar is an essential factor, and it can readily be seen how accurately the wax pattern can be placed. None of the difficulties is encountered which confront the operator who attempts to fit with pliers and correctly locate a heavy piece of metal over an area which frequently presents many irregularities. Although an advantage is obtained by fitting a 14-gauge wire, backing it up with platinum foil or 36-gauge 24K. plate and uniting and building up the structure with solder, a bar made in this way is not as serviceable as the cast bar we have described. Subsequent soldering operations tend to disintegrate the soldered masses and cause a weakness at the juncture of the bar with the saddles or clasps. Furthermore, a bar built of solder is more apt to warp in subsequent soldering operations than any cast bar, if a suitable, proper casting alloy is employed.

The strength of such an alloy as Ney-Oro F is more than ample for lingual bars etc. hence castings for this purpose may be made comparatively light with safety. Precaution must always be exercised in casting alloys of this character to use a "reducing" flux and thereby prevent oxidation of the copper content. This is very important and applies throughout practically the entire casting process, hence will be discussed in detail in subsequent articles.

P. O. Drawer 1403

TO-DAY

Sure, this world is full of trouble—

I ain't said it ain't.

Lord! I've had enough an' double,

Reason for complaint.

Rain and storm have come to fret me,

Skies were often gray:

Thorns an' brambles have beset me

On the road—but, say,

Ain't it fine today!

What's the use of always weepin'

Makin' trouble last?

What's the use of always keepin'

Thinkin' of the past?

Each must have his tribulation,

Water with his wine.

Life it ain't no celebration.

Trouble? I've had mine—

But today is fine.

It's today that I am livin',

Not a month ago,

Havin', losin', takin', givin',

As time wills it so.

Yesterday a cloud of sorrow

Fell across the way;

It may rain again tomorrow,

It may rain—but, say,

Ain't it fine today!

—Douglas Malloch.

FIXED BRIDGEWORK—INLAY ATTACHMENTS TO VITAL TEETH, WITH SPECIAL EMPHASIS ON PORCELAIN ROOT ENDS*

BY E. W. GRAEBNER, D.D.S., CLEVELAND, OHIO

CAVITY PREPARATION

REALIZING THE NECESSITY for the conservation of the pulps of teeth, it is absolutely necessary to prepare our cavities for the abutments in such a way that we may be able to supply fixed bridgework with the least amount of tooth destruction. With this in mind the Carmichael attachment, which has been modified by Dr. Tinker, is at present the most efficient method which we have at our command. In this type of preparation the enamel is not removed in its entirety and the depth of the preparation is much less than is necessary with the ordinary gold crown or with the average inlay. By the use of special rigid platinized gold we are able to make castings much thinner at the same time affording sufficient strength for reasonably extensive bridges.

MODELS WITH INLAYS SHOWING DIFFERENT ATTACHMENTS

These technical models are prepared from biscuit teeth, cavities having been cut in them showing the various steps of cavity preparation which are then put in the furnace and brought to a glaze at a temperature of 2310 degrees, just giving sufficient smoothness and shrinkage without losing detail of cavity preparation. I have chosen this kind of a model for technical use because I prefer working on a tooth which is not changed by atmospheric conditions and will always remain permanent, rather than using a normal human tooth which undergoes dehydration and change of shape, consequently producing poor-fitting castings and which are often unsanitary to handle. With very slight exception the shrinkage in baking puts these cavities in perfect condition to take an inlay. It is seldom that the preparation has to be stoned before taking an impression for an inlay, but where the shrinkage has made that necessary it is always advisable to do so. These models show preparations on central incisors, lateral incisors, cuspids, bicuspid, first molars, in fact, any tooth in the mouth may be equipped with a casting of this kind which would take care of any condition that might arise in bridge-work. I will not go into the different types of preparations in this limited time, but would refer those interested to the article by Dr. Tinker in the March, 1920, DENTAL SUMMARY.

*Given as a clinic at the Northern Ohio Dental Association, June, 1921.

REASONS FOR ADOPTING THIS TYPE OF FIXED BRIDGEWORK

I have been impartial in my choice, only endeavoring to adopt a method which would be most efficient for my patients, producing the most sanitary condition and giving the best service. Let it be understood that I do not advocate fixed bridges to the exclusion of removable bridges and partial dentures, nor *vice versa*, but believe all of these types have their place in the office of the conservative dentist.

In the first place, the esthetic effect produced in anterior cases by this type of bridge is perhaps the best that can be obtained. Contact points which are so essential in maintaining healthy mucous membrane are in their correct relations, approximating the natural contact point, more nearly than with almost any other kind of fixed bridgework. The contour of these bridge teeth can be developed to a higher degree in this type of work, giving a more natural feeling to the tongue, which permits clearer enunciation in speech, and deflects food from the membrane in such a way as to maintain a more healthy condition than is otherwise possible. The embrasures permit of easy cleansing and because of this, better condition of the interseptal tissue exists. The glazed porcelain root-ends which are in contact with the mucous membrane at the crest of the ridge are non-permeable to bacteria when correctly prepared, and are more tolerable to the tissues than any other material which we have at our command at the present time.

PREPARATION OF BRIDGE PIN FACINGS FOR PORCELAIN ROOT TIPS

The main purpose of this paper is to help those who are constructing fixed bridges to a better and more simplified technic, which will elevate the status of fixed bridgework, which we all agree needs all the elevation it can get at this time. With this in mind I am going to show a few of the things I do in constructing these bridges, with the hope that some one will be helped and encouraged to do the best he can in this line of work, and be able to make the porcelain-tipped bridges which are otherwise considered difficult. Let us start this description with an ordinary bridge, the impression having been taken and the abutment attachments on the occluding models ready to construct the dummies.

CONSTRUCTING THE PORCELAIN TIPPED DUMMIES

Select the teeth for the case, preferably the new molds of the Trubyte long-pin facings, with blunt platinum-alloy pins. These teeth permit us to obtain a better esthetic effect, especially in the anterior cases, also offer better retention than the short-pin teeth which we have had in the past years. Preparing these facings for the bridge, the edges are beveled just the same as was done for the old style gold backings, except the cervical is made narrower to give better interproximal spaces.

The glaze is removed with carborundum stone from the cervical ridge lap which gives better retention for the porcelain. The facing is then placed in the *special instrument* for making the porcelain root

tip which I have designed and which can be obtained from the Cleveland Dental Manufacturing Company as shown in cut below.

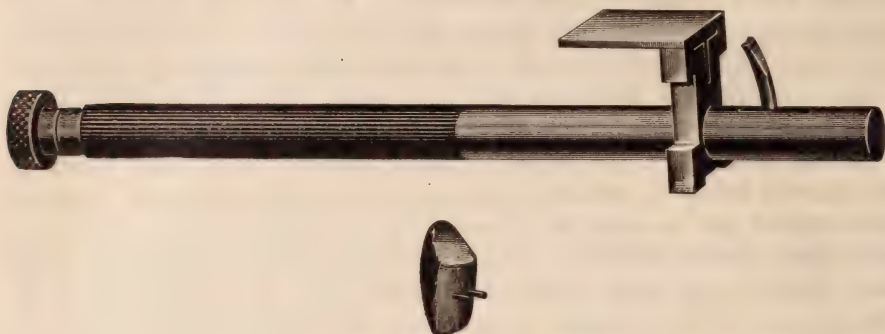


FIG. 1.

This instrument is an outgrowth of a need I found to simplify the porcelain technic, and has met with much approval by those who have used it. The set-screw at the end of the handle controls the retaining point, the facing is placed in position, the pins inserted in the slot, the set screw is tightened, which brings the retaining point against the porcelain, and holds the facing firmly in the correct position for the application of the porcelain.

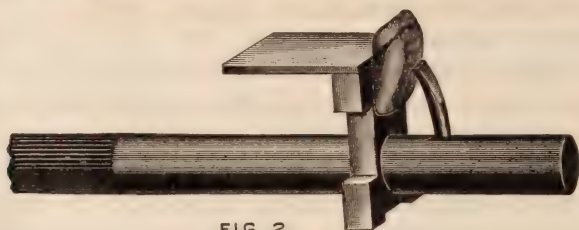


FIG. 2.

The flat plate is made of case-hardened steel, highly polished, and is at right angle to the facing which gives the correct angle to the finished porcelain without any carving, which when glazed produces the correct draught for withdrawing the wax pattern which ultimately makes the gold backing. Nothing is required on this plate except to see that it is kept bright and clean, but if one desires to use a little oil, be careful to wipe it quite dry before the facing is adjusted in the instrument.

We are now ready to mix the porcelain, and for most cases Shade 3, S. S. White No. 2560 degree porcelain blends nicely with most of the cervical shades, but the other shades can be blended to suit the case at hand. Place dry porcelain on one end of a clean slab and several drops of distilled water on the other end. Small amounts of porcelain are then drawn into the water until a thick creamy mix is made. Take the creamy porcelain and apply to the facing, covering the gingival third and the back, building on more and more as the first mass is vi-

brated into position. Just as soon as the moisture comes to the top, invert the instrument with the wet porcelain and take up a bit of dry porcelain with the moist porcelain. Tap this new porcelain in position with a porcelain carver and vibrate the instrument again with a knurled instrument against the case-hardened flat plate. The flow of the porcelain is controlled by holding the instrument in various positions according to the shape the porcelain takes with gravity, and then more dry porcelain is again added until the tip is formed to approximate the size needed for the case in hand. Have it at least a little larger so that it can be dressed down with an instrument, a fine brush or the end of the finger, which works very nicely. You will be surprised at the strength of the mass of porcelain due to this condensation with the instrument and the vibrating; and the addition of porcelain should be continued until no more moisture appears in the newly-added porcelain. When this is finished it should look like the cut shown in *Figure 3*.

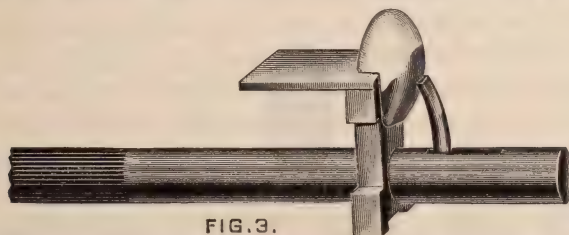


FIG. 3.

The end set screw is then released, the retaining point moved away from the facing, and, with a knurled-handled instrument, vibrated on the hardened plate; the porcelain facing with the root tip will release from the instrument and can be dropped on a towel or any soft article on the bench. Then bevel the edges of the newly-formed porcelain and make them continuous with the previous bevel on the facing. Dust the tooth carefully with a fine brush, and we are now ready to mount this on a piece of heavy platinum foil with a slot or holes near the top which will take the pins. (*Figure 4*.)



FIG. 4.

This little suggestion makes the tooth easily handled to and from the furnace muffle, and also keeps the tooth free from contamination from trays and silex, etc., which mars the beauty of the finished product. This platinum carrier is then placed with the tooth mounted as shown in *Figure 4* in front of the open muffle, which in the meantime has been turned on to the first button or the low heat of the furnace.

Allow this to stand there for a few minutes until all moisture has disappeared and the facing has been brought to a high temperature. It now can be placed in the muffle. *Do this with care.* The door is then closed and the furnace is run up to 2560 degrees, or the point that your pyrometer shows you have a nice glaze, then withdraw tooth from the furnace and allow it to cool. The tooth is then placed back on the model to check up the length. If there is a question of the root being too long, just bring the first bake to a high biscuit, namely, 2400 degrees. It may then be ground to the exact length and replaced in the furnace and again brought to the high glaze of 2560, being first careful to remove all particles of carborundum grit by washing or spraying. If this is not observed black spots will appear in the finished porcelain. One baking is sufficient to produce an excellent result and the quality of the porcelain, through the thorough condensation, is so fine that the root tip is homogeneous with the facing, as I have shown in the various models. (Fig. 5.)



FIG. 5.

This phase of the work seems to be the greatest drawback in constructing this type of a bridge, and for this reason I am concentrating my clinic on the porcelain side of the work, which with a little skill can be developed by any one and excellent results obtained repeatedly. There are a few points perhaps of interest to the beginner in porcelain work worth while mentioning. In the *first* place, do not use 2560 degree porcelain on all pin teeth unless you know the fusing point of the porcelain and the quality of alloy in the pin; *second*, watch the tooth in the muffle through the blue glass at intervals until you are sure of the fusing point shown on the pyrometer; *third*, Trubyte teeth, of the Dentists Supply Company, will stand the 2560 degree porcelain, and fuse at a bit higher temperature than the added porcelain, but be careful not to overfuse the porcelain, which shows first by the facing beginning to bend; *fourth*, S. S. W. 2350 degree porcelain, or any low-fusing porcelain, may be used, but the result is not generally as good because the facing is not reglazed at that temperature, therefore, the finished bake shows a line of demarcation where the tooth has been ground; *fifth*, do not fuse porcelain more times than is necessary because every baking weakens it and tends to make it fuse at a lower temperature each time; *sixth*, 2560 degree porcelain will fuse at 2500 degrees if the article is left in the furnace for a longer period of time; *seven*, bring the furnace up to the high heat promptly but regularly as per directions; then the time element in fusing is eliminated and better results are obtained each time under nearly the same conditions.

MAKING WAX PATTERNS AND THE USE OF CARBON CORES

In making wax patterns definite rules should be followed. Remember your casting never comes out of the investment smoother than the wax pattern itself. Do not use alcohol, acetone or ether to wash the wax pattern. Invest it just as it is. The waxes I like best are Maves' Hard Green Wax and Kerr's Blue Inlay Wax. They have worked best for me up to the present time, but no doubt there are others that are just as good, and I am only giving you the ones that I have had the most experience with. The tooth as shown in *Figure 5* should be lubricated with a high grade oil or water. The wax is then softened to a workable stage and forced on to this facing. Either by using a matrix or by developing skill with the fingers one can confine the wax to the facing under pressure until it has cooled. Whenever possible use a matrix; it always produces a better result but it is not always essential. The carving of the wax is done in the usual way excepting no sharp knife should be used to cut the wax near the margin, but rather burnish the wax against the margins. In order to produce a very smooth surface do not use any solvents of the wax, but take a soft piece of China silk and wipe the wax and a very smooth surface will be produced.

In order to withdraw this wax pattern from the tooth facing, I find it very helpful to warm a piece of sticky wax and apply it to the facing. Then with the sprue placed at the thickest portion of the inlay wax pattern one can withdraw this pattern from the facing. This having been done, we mount the sprue, which should always be placed in such a position as to allow the gold the quickest access to the remotest parts of the investment. One sprue is usually sufficient with a centrifugal casting machine of the spring type, which I find most convenient for castings of this kind, but this will have to be determined by the method of casting that the operator may prefer. Whenever I expect to cast into a cold mold and not overheat the gold before casting, I prefer having a sprue almost as large as the ordinary bur. The quicker the gold can get into the investment, the less one needs to heat the gold in order to make sure that it gets to all parts of the investment. The wax pattern is now mounted upon the sprue former, and small carbon points which I have been able to obtain at the supply houses are the exact gauge of the hole left in the pattern. These are used for maintaining the position of the pins. The rough edges of the carbon are smoothed with a file and they are inserted as cores in the wax pattern. (*Figure 6.*)



FIG. 6.

INVESTING

We are now ready to invest the pattern. I prefer using the double investment method, namely, painting on the investment compound over the wax pattern so that all parts of the pattern are covered. This

method enables one to use a heavier investment, giving more strength and density, consequently more smoothness to the casting. When this has dried for a few minutes, we are ready to put the ring in position and fill it with a quite heavy mix of investment. Up to this time I have tried many kinds of investment compounds, but I obtain the best results at present by using Weinstein's Cast Clasp Investment with a small portion of Kerr's Snow White Plaster added. There may be others just as good, we shall all be very glad to change whenever we find a material which produces a better result. If we use the investment quite heavy, which seems almost too heavy to the operator who is used to pouring quite a liquid investment, we are able to dispose of the wax by the method advocated by Dr. Knapp, namely, waiting at least fifteen minutes, but preferably a half hour, unless an accelerator is used to speed the setting until the investment has set quite hard. Then holding the ring over a hot Bunsen flame and utilizing the water of crystallization of the investment which is brought to a boiling point below 212 degrees, and which in turn melts out the wax pattern and leaves the investment free from all wax. This method produces very sharp castings and cuts the time element about one-half in the burning out. I also have obtained very excellent results with the slow elimination of wax over a longer period of time by heating the investment rings no higher than 400 degrees for a sufficient period of time to volatilize the wax, and leaving only a fine film of carbon inside the investment. In order to remove all trace of carbon, if one is desirous of the most accurate margins, one must extend the period of time considerably longer and also use a higher temperature, which is detrimental to the plaster content of the investment, which is the binder of all investment. This we learn begins to disintegrate about 360 degrees, and if we carry our heat any higher than that point we are beginning to change the quality of our investment, which no doubt accounts for the rough castings and imperfections which we have experienced heretofore. In burning out the wax whenever possible I use an electric hot plate, keeping the rings on a metal tray away from the top of the stove so that it does not receive an abnormal amount of heat. I use a thermometer which registers up to 500 degrees, and I found with the current which I use that the medium heat of this stove seldom runs any higher than 350 degrees, which, as far as I am able to find, gives very excellent results. This stove does not need to be pretentious, but any metal hood in which one can insert a thermometer having a little opening for the moisture to escape, will answer the purpose. We are very anxious to have a uniform heat maintained throughout the burning-out period. The ring and investment should be removed from the oven as soon as no trace of moisture is left in the investment. It may be then set aside to cool until it can be readily handled and we are ready to cast. If one is to make very thin castings we must use an equipment that will deliver the gold to the mold in the shortest possible time, and the gold should

be heated away from the ring so that we do not distort our molds. The little spring centrifugal machine or any other machine which heats the gold in a crucible away from the mold and has a good getaway is very desirable. And I find where the gold can be delivered quickly to the mold it need not be heated so excessively, which also is an essential factor in producing smooth castings. If the gold is brought to an excessive heat it burns the plaster mold and produces a roughened surface.

The casting having been made (*Figure 7*), we are ready to remove the



FIG. 7.

carbon cores from the casting. This can be easily done by first using a round bur smaller than the gauge of the carbon core, then using one which just reams the hole clean so that the facing may be readily put into position. If one has developed a technic to this point, these castings should fit into position without stoning or modification, except in cases where very large castings are made, where there will be no doubt some contraction because of the amount of gold that has been used. *Figure 8* shows the facing with the root tip and the gold backing ready for assembling.



FIG. 8.

THE ASSEMBLING OF CASTINGS FOR SOLDERING

The castings are polished as individual units and are now mounted for occlusion and assembling. This can be done in various ways, but a very helpful hint which I received from Dr. Bush, of Columbus, whereby each individual casting is warmed and sticky wax applied to the warmed surface of the casting makes it hold very tenaciously, and the most extensive bridges may be assembled without reinvesting if one exercises care. It is preferable to assemble one or two pieces and solder. Do not make great big contact points of solder. Try to keep them as small as will be consistent with the strength required, depending upon the stress the bridge is expected to carry. All parts are assembled. The last joint is made so as to minimize the error in shrinkage of solder and change in investing compounds. If this is carried out carefully and the attachments are parallel as they should be, one should experience no difficulty in putting the bridge to place.

We are now ready to cement the facings into position and the bridge is ready for the try-in in the mouth. Where anterior teeth are to be replaced, it is preferable to make the abutment castings, take an impression and bite, cut out the teeth from the model which are to be

extracted, retaining the outlines of the gingival margins, cutting the model so that the roots may be inserted part way into the tooth sockets. The bridge may be finished and ready for the patient the day of extraction. After the sockets have been thoroughly curetted the bridge may be set temporarily with Smith's Medi Cement, which permits of easy removal. After waiting a week or more if desirable and no trouble has occurred, one may safely cement the bridge finally in position. This produces as near a perfect result as we are able to produce at this time. We are still hoping that more strides will be made toward better bridgework, ever hoping to improve our methods with the one end in view of better service to the patient.

864 Rose Bldg.

REMOVABLE BRIDGE WORK—CAST CLASP TECHNIC*

BY RAYMOND M. BONDY, D.D.S., CHICAGO, ILL.

IN REMOVABLE BRIDGE-WORK we are trying to do away with devitalization and preserve vital teeth. Where there is a choice between fixed and removable bridge-work, I believe we should choose the latter because we are not dependent on any attachment, which in turn is dependent on cement for retention. We do not have to cut into vital tooth structure, which is always somewhat dangerous. Therefore this class of work comes as near being fool-proof as any we have.

The cast-clasp technic is very simple but no matter how well you do this work or how perfect a restoration you make it will be a failure unless you have the co-operation of your patient. The patient must keep the teeth which are supporting the clasps absolutely clean; otherwise decay will set in. The materials you use are a matter of the personal equation, as is also the casting machine. If you are using certain materials or casting machines, stick to them as long as you get good results. For the benefit of those who have not done this class of work I will give the technic that I follow, naming the materials with which I have had the best results.

For impressions I use solvite, coating the impressions with solvite separating fluid. Allow this fluid to harden. After the impression is run up and hardened, place in boiling water and the solvite will disintegrate from around the model, leaving the model coated with a film-like substance, which is the separating fluid. This can be peeled off very readily, leaving a sharp clear model. For the models I use Weinstein's cast clasp investment material, which I also use for investing

*Stenographic report of clinic given before the Tennessee State Dental Society, May, 1921.

the models. If you desire, you can paint your models with a solution of silex that will harden the surface, but I do not find it necessary. I find Kerr's cone-shaped points are handy to use in taking impressions for mesio-distal grip clasps. For waxing up clasps I use Kerr's sheet wax, 28-gauge. I use a double thickness of that wax for my clasps. As a rule that is as thick as necessary, but it all depends on the particular appliance you want to make, as you cannot use the same thickness of clasp on every case. I use S. S. White's 20-gauge base-plate wax for saddles. If the teeth are not clean, I take ammonium fluoride and go around the teeth, and then oil them with vaselin so that the plaster will not stick.

In taking impressions for single clasps, use Roach's split trays which come in two types. One open at one end, used in taking impression of a tooth where there are teeth adjacent, the other closed at each end, used where the tooth stands alone. Oil teeth, fill tray with solvite, place over tooth where impression is wanted. Allow to harden. Force instrument into split on the tray and the impression will break away in two pieces. In taking impressions, for small bridges take an ordinary bridge tray, oil it, fill with solvite and force down over abutments and saddle. Allow to harden and remove tray from impression, then place your finger under edge of impression on the buccal and with a slight prying movement, break the impression. This will usually break cleanly in two or three pieces and can easily be placed back in the impression tray and waxed together.

The reason for using split trays and breaking away impression in this manner is, that you must have an absolutely clear, clean-cut impression and if you try to pull your impression off the teeth you are likely to distort it.

Success in this technic all depends on whether you get a perfect impression. The type of clasp used mostly is what is called the buccal-lingual rest clasp. This is used on molars and bicuspid. Next is the embrasure hook clasp, used on cuspids and sometimes on laterals, and centrals and once in a while on a bicuspid where the bite is close. Third, the mesiodistal grip clasp, used principally on laterals and centrals, and sometimes on cuspids.

Before taking impressions, for mesio-distal grip clasp, round off your teeth, so that you will have no square shoulders. If you have a thin place in your clasp it may crack. You have more strength in a rounding surface than in a right angle.

There are certain types of cases where this restoration is especially indicated. A patient comes in with a natural spacing between the front teeth and with a central or lateral missing. The removable bridge is the ideal appliance in cases of this type. The natural spacing is just what you need for your mesio-distal grip clasp. Where you do not have the natural spacing, you can make a little space with a very fine separating disc, a space just large enough for 28-gauge wax to go in

to, and it will not harm the tooth structure. You can shape up your tooth to match the natural opposite tooth, and when the appliance is finished, these little mesio-distal grips look just like small gold fillings.

In taking the impression for the mesio-distal grip clasp you must get an exact reproduction. Oil the teeth, being careful to get the oil down in the spaces between teeth. Always take impressions for each clasp separately. Heat one of the compound cones, and force the compound in from the lingual, forcing the compound right up in through the spaces between teeth. Then cool well. Take an instrument and cut off the superfluous compound at the cutting edge. After you have cooled that carefully, remove it. That gives you the little flange in between those teeth. This is very important as it shows you the exact space for thickness of clasp. This is the first half of the impression. Put that back into place. Heat another cone, bring that up and lap it over the other impression from the buccal. Cool it. Take a blunt instrument and make a line through center, so that in case they come apart you can put them back together in proper relation. Cool and remove. Run up with model material.

You may want a double clasp, which will be an elaboration of two or more of these clasps. You cast these double or triple clasps all in one piece. Take an ordinary bridge tray and fill it with the modeling composition, and push it down over teeth, and cool it well. Carefully remove and you will have your little filaments of compound in between the teeth. To overcome any distortion of compound, I mix a little solvite very thin and put it in modeling compound impression, and force it back to its proper relation, allowing it to harden and then carefully remove, and you will find you have a sharp clear impression with the filaments of compound showing the exact spacing between teeth.

Suppose you want to make a bridge from cuspid to second or third molar, and the teeth are tipped toward one another. You cannot cut the teeth down parallel. Take your impression and cut out around necks of teeth until you can look down and see they are parallel. This saves building up on your model after running it up. When you cast, you have not spoiled the fit of your clasp. It does not matter how much your tooth is tipped, you can cut it as much as you want to, and although you will have a space in your finished casting between the clasps and saddle, it makes no difference, because this is a removable appliance and can be kept clean.

I do all my casting of clasps and small bridges direct to models. In large cases, where I make clasps and saddles separately, I wax up clasps and saddles and grind in the teeth. Put teeth in place, and then lift them out; take a fine lancet, heat it, and cut off where the saddle is attached to the clasps. Then lift the saddle off, investing it separately, because I want to use the model to cast my clasps on. That is the only place I do not cast direct to the model.

Take your teeth, which are usually Davis Crowns, and take a small mounted stone and enlarge the hole where your post ordinarily goes, to about twice its size. Then take a toothpick and oil the hole, and the base of the dummy. Take a small piece of base-plate wax, heat it, mold it to a point, and put the point in hole and force it down well around the back of the tooth. Then force waxed tooth down on your saddle. Flow your wax in around tooth and carve it up as you want it for casting. Your tooth will come out easily and the post for your tooth to sit on is firmly attached and cast on saddle.

Assuming you have made saddle and clasps separately, the technic is the same, but you have come to the point where you want to put the saddle and clasps in the mouth and take an impression. Put the teeth back on the saddle, place the clasps and saddle back in the mouth, have the patient bite and see that the articulation and the occlusion are as you want them. Take an ordinary bridge tray and split it down the middle, making opening large enough so it will easily slip over a match. Remove the facings and take a match or small wooden stick and place one end down on the saddle, with the other end resting on the teeth above, or below, as the case may be. Have the patient bite just as though the teeth were together naturally, not using any great pressure. Then fill this tray with solvite or plaster, place your tray so opening will slip down over match, and force down into place. Allow plaster to harden. Remove and you have in your tray clasps and saddle in their proper relation, with your impression taken under normal masticating pressure. Run up on stone model and solder clasps on saddle. When you place this back in the mouth you will have your saddle resting on the ridge under normal pressure.

We are ready for fastening the sprue on the cases for investing prior to casting. You fasten the sprue differently according to the type of casting machine used. If you are making a small bridge and are going to cast saddle and clasps in one casting and are ready to fasten sprue on case, take a little sheet wax, the same width as clasp, and fasten it to the open end of molar clasp, making it very thin at the point where the clasp ends. I make a little crease to show me where I want to cut after casting. I use a steel sprue about twice the size of a graphophone needle and fasten it at the end of clasp where wax has been attached. The technic I have just given is used where a centrifugal machine is used for casting. When a compressed-air machine is used fasten sprue at a point about the center of saddle.

To overcome danger of air bubbles in casting, fasten a small filament of wax at the end of the clasp so that the gold will flow out beyond the end of casting and force any air bubbles out with it. When compressed-air machine is used fasten small filament at each end of casting. You will have a nice clean casting with no air bubbles in gold.

Now you are ready to invest. You have carved the case the way you want it, and have smoothed up your wax. You must get it smooth

as your casting will only be as smooth as your model. Dip this in cold water, and take a small piece of china silk and dip in alcohol, and clean model. This will smooth up your surface. Carefully remove your facing. It is possible, when you oil your facings, some of this oil has transferred to your wax. Investing material will not stick to an oil-coated wax, and after you have cast that you will see a lot of small bubbles that you will have to take off with a bur. To overcome this take a wide-mouthed bottle, and fill it with acetone, and put wax model down in the acetone and leave it for a minute or a minute and a half. That will cut the oil. Then mix up a thin investment material, and with a camel's hair brush, coat model and shake off excess two or three times. By that time the first coat will have started to harden. Coat it around until wax model is completely covered with investment material, but do not try to invest it with the same mix you are painting it with. Paint it well and let harden. Mix up a new batch and put it in from the side of the ring, tapping it well, and lay it aside from 45 minutes to an hour. Do not leave over night. Cast it as soon as possible after complete hardening. Then take a pair of tongs, which hold your ring firmly, and pass ring slowly through the gas flame, being careful not to let the flame come in contact with the ends of the ring where the investment is exposed. Soon you will see wax melt out, along with a lot of moisture. That is the reason you do not want to leave it in too long. You want that moisture to come out with the wax, because that moisture is washing out the sides where your wax pattern was and will give you a clean cavity to cast in. As soon as the excess of moisture is out, and there is just steam coming from your ring, put this in your electric furnace. I use a Maves furnace, and cut two holes in it, one for a thermometer and another for the steam to escape. Put in the furnace and allow it to heat slowly, never going above 320° ; heat for 45 minutes. Lay it aside until it has cooled to room temperature, and put it in the casting machine and cast it by any method you want to. It won't take more than five to eight minutes to finish the case if you have been careful of your casting technic. If you do not have a Maves furnace, take a piece of tin and put it over a Bunsen, and allow it to heat two hours. Test it with a mirror and if there is no moisture, it is ready for casting.

When you heat up your gold be careful not to overheat. I never use an oxygen or blue flame on gold. Take the brush flame of a blow pipe and heat the gold up slowly until it gradually starts to congeal and come up in a ball, and when the gold gets the translucent effect, sort of coats up, make your casting. After your case is cast it is polished, and you are ready to put it in the patient's mouth, and you try to put it on and it won't go into place, and you think you have a failure. If you have taken a good impression and have followed this technic, you won't have failures. You may have to take your pliers and open the clasp a little to start with. Put on the posterior clasp

first and tap it up one-third of the distance, then you may have to take an instrument to get it off. You will find a little bright spot here and there. Take a mounted stone and relieve wherever you see these bright spots. Try it again and the first thing you know you will have one attachment on. The same with the anterior clasp, relieving the attachments wherever the bright spots are, and after a while it will slip into place and you may have some trouble getting it off. I usually have the patient wear it 24 hours. Test out the cases with carbon paper and see that there is perfect occlusion and articulation. Do not mind the tight feeling, but you must be sure of your occlusion. Always polish the inside of your clasps. There may be a little roughness there which will cause an abrasion of the enamel. Warn the patient he must keep the appliance clean. If the patient does not want to go without teeth while you are waiting for shrinkage after extraction, make him a temporary case in vulcanite. Sometimes you can make good permanent restorations with vulcanite saddles instead of gold.

Radiograph your roots before making your bridge. If you have good parallel roots you do not run any risk when you put in a removable bridge. In fact if the patient does his part you will give him something that will give him better service than anything I know of.

Some of you men who are skeptical about removable bridge-work will find that this technic of cast clasps used on lower lingual-bar plates and partial upper plates where palatal bar is used will do away with misfit plates and will give your patients far more comfort and better service for their dentures than any other attachments.

In order to get the best results from any technic, one must understand it thoroughly and not misjudge or condemn a technic because of one or two failures due, perhaps, to lack of knowledge of the technic on the part of the operator. Removable Bridge-work, cast clasp technic, has its place in dentistry, and if the technic is followed out carefully and correctly many teeth will be saved and serviceable appliances given to our patients.

153 W. 69th Street

CAST GOLD INLAY FUNDAMENTALS*

BY E. R. HART, D.D.S., ST. LOUIS, MO.

I APPRECIATE THE HONOR bestowed upon me of being asked to be your essayist and clinician again this year, and I trust my work this week will justify your choice.

In the making of the cast gold inlay, certain fundamentals are absolutely necessary. The utmost care and attention to detail in every step is required.

In the preparation of the cavity we follow the teachings of Dr. Black, the only variation being that the walls of the cavity must be absolutely smooth and have proper draw; there must be no chisel or bur marks or undercuts; and the cavo-surface bevel must be smooth.

Beginning with an ideally prepared cavity, the next important step is having a definite and accurate wax technic. In our practice, we find Taggart's wax most ideal and it can be softened in dry or moist heat at about 125 to 135 degrees Fahrenheit. After the wax is softened, it is applied to the cavity which has a properly-applied matrix; the pressure on the wax should be applied in the direction of the long axis of the tooth. A properly formed matrix is one that allows the wax, as it is forced to position in the cavity, to register the point of approximal contact on the adjacent tooth. Next, all surplus wax is removed from the occlusal surface, after which the occlusal surface is softened with a warm instrument, and the patient is instructed to close and triturate. Next, the embrasures are formed, not by guess, but by noting the outline form of the approximating tooth. So far, we have registered in our wax the cavity walls, seats, cavo-surface bevel, the approximal contact point, its size and shape, also the point of deepest penetration of the opposing cusps, the angles of the inclined planes and the embrasures.

Next, we remove the matrix, refine the entire periphery which covers the cavo-surface bevel, and then our attention is given to carving the proper inclined planes, sulci and marginal ridge. The sprue wire is now attached, either in the mouth or after the wax pattern has been removed. The wax pattern, viewed from the approximal side, shows an indentation. This indentation, which is the lowest point on the approximal side of the wax pattern, becomes the highest point, or the point of approximation, on the finished gold inlay. I would like to stress the approximal contact point. It cannot be guessed at. Its shape is determined by the tooth with which it is to contact and not by guesswork. A contact point made by soldering is usually improperly located and improperly formed, which, in turn, means improper embrasures, all of which lead to injury of the trans-septal fibers of the gingival tissues.

*Remarks before the Tennessee State Dental Association, May, 1921.

The wax pattern, with sprue wire attached, is now mounted on a suitable crucible former, which is highly polished and lubricated. Now, we are ready to begin the investing of the wax pattern. The investing material must be a refractory compound that is known for the constancy of its reliability. This we have found in Peck's gold inlay investment, which we have been using for some eight or ten years. This product has proved so satisfactory and so reliable, and the mixing of it is so simple, that we give it first place in our office.

A strict adherence to the following technic of mixing the investment will produce results which I do not believe possible with any other method. Use the very largest rubber bowl and put into it a greater amount of water than you would actually require, sift the investment material into the water through a small sieve and allow the material to settle in the bottom of the bowl until the excess water becomes clear. With a rubber ear syringe withdraw the water, with your spatula incorporate into your mix the investment which did not submerge into the water, rotate the bowl gently in both hands for about ten seconds and you are ready to proceed.

With a number one or number two camel's hair brush the creamy mixture is taken from the bowl and gently put on the wax pattern. Be sure never to paint it on. This will avoid all air bubbles. After the wax pattern and sprue former are completely covered, the ring is placed in position, and the remainder of the investment is slowly poured down the side of the ring. Be careful to avoid jarring. Allow thirty minutes for the compound to set, after which the surplus material is trimmed from the bottom of the flask and the crucible and sprue former are removed. The flask is now placed in an oven in which you have perfect control of the heat. With the investment we use, we find 400 degrees Fahrenheit the proper temperature for dissipating the wax. The time required to dissipate wax is governed by the size of the wax pattern and the amount of investment material that surrounds it. When the sprue hole ceases to emit smoke the flask is removed from the oven and allowed to cool. Remember that overheating the mold weakens its resistance to internal pressure.

As to casting machines, I want to say that any machine will give you a casting, but what with the oneness of pressure and the varied elements of failure, I feel it well to use some simple machine which can be regulated at the will of the operator. We use the Burns machine.

First the machine is tested and the flask placed in position. Having decided upon the alloy to be used, the required amount is placed on a seasoned charcoal block, and, with an oxy-acetylene flame, is brought to a heat just below the melting point. Then the gold is placed in the crucible of the flask and the flame played upon it for our melt. When the nugget has reached a molten stage the machine is closed, sending the gold to the extreme of the mold, there to congeal and become the casting that has reproduced the wax model.

If the cavity has been properly prepared, the wax properly manipulated, the investment correctly mixed and applied, the machine tested before casting, the boiling point of the gold carefully noted, then, and only then, can you expect good castings.

Having removed the casting from the flask and brushed it free of compound, it is placed in hydrofluoric acid to free it of all of the silicate which always adheres, then it is placed in a saturated solution of sodium bicarbonate, to free it, in turn, of the acid. The casting is now examined with a magnifying glass to make sure as to its definition. If all is well, we proceed to the finishing and cementation.

QUESTIONS AND ANSWERS

Question: How about a vacuum machine?

Dr. Hart: My experience with a vacuum machine has been unfavorable; I found the possibility of leakage too great.

Question: Do you use the same investment for inlays, three-quarter crowns and saddles?

Dr. Hart: We use Peck's for investing all castings from inlays to full dentures.

Question: What gold do you use?

Dr. Hart: The gold we use for all inlays or cast abutments is made after a formula that I have developed.

Question: How do you order it or what is the name?

Dr. Hart: It is designated as Hart Gold and is manufactured by the Subert Dental Specialties Co., of St. Louis.

Question: Can you recast this gold with good results?

Dr. Hart: The residue button can be recast quite a number of times; in fact, as long as the top surface remains bright and polished.

Question: After casting, how long before you can remove the cast?

Dr. Hart: Not until the flask can be taken into the hands.

Third Nat. Bank Bldg.

A PRAYER

TEACH me that sixty minutes make an hour, sixteen ounces a pound, and one hundred cents a dollar. Help me to live so that I may lie down at night without a gun under my pillow—unhaunted by the faces of those whom I have wronged.

Help me to earn my meal ticket on the square and in conformance with the Golden Rule.

Deafen me to the jingle of tainted coin—to the rustle of unholy skirts.

May I be blind to the faults of my fellows and see my own clearly. Guide me so that I may look across the dinner table at my wife and have nothing to conceal.

Keep me young—that I may laugh with the children. Make me sympathetic—that I may be considerate of the old.

When comes the day of drawn shades and fragrant flowers, of quiet footsteps and hushed voices, when the wheels crunch on the gravel walk and the neighbors whisper, "How natural he looks!"—make the ceremony short and the epitaph simple:

"Here lies a Man!"

GEORGE LEE, in *Popular Magazine*

CONTRIBUTING FACTORS IN THE RETENTION OF
ARTIFICIAL DENTURES*

BY DAYTON DUNBAR CAMPBELL, D.D.S., KANSAS CITY, MO.

ONE OF THE MOST VALUABLE contributions to the retention of artificial dentures has been made by the oral surgeon in the operation known as external alveolar resection. While there are several names for this operation, alveolectomy, alveolotomy, etc., I believe that Dr. Lucas uses the correct phrase when he calls it *external alveolar resection*. Some phases of external alveolar resection I wish to present in connection with the first few slides, because some men are still "pulling teeth." Some men are extracting, but the real operation is surgical removal. The method which your essayist is constrained to believe should be practiced, is that in which the muco-periosteum is stripped back and a portion of the external plate removed, the teeth and spicula removed and all known areas of infection curetted; the tissue is then brought to position and held with temporary base-plate splints.

There is intense satisfaction in supplying an improvised denture immediately after the teeth are removed; and the satisfaction is increased through knowing that the denture is worn very comfortably from the first. This operation makes it possible. If a patient feels that he cannot be absent from business duties for even a day or two, this is in truth a God-send. We have had several cases in our practice in which the change has been made from the natural teeth to artificial ones, without even the closest friends becoming acquainted with the fact that the teeth had been removed.

It is often essential from a psychological standpoint, and it is always a wise practice to take impressions of the teeth before they are removed. This will enable the operator to preserve a record of the alignment and the proper lap or spacing of the teeth in order to reproduce the desired effect in an individual case. *Figure 1* is a picture of the patient's teeth set in the modeling compound impression which was taken before the teeth were removed.

Here you will observe a condition which presents a problem in adapting a lower denture—you have that high, thin ridge, a cross-section of which looks very much like an end view of a steel rail. It does not afford us a satisfactory base for the denture. A flat mouth in the lower is, as a general rule, a better mouth for a lower denture than one which has this ridge such as we have described.

During mastication, these spiculæ or sharp points of alveolar process that stick up within the body of the ridge at intervals along its crest,

*An illustrated lecture before the Northern Ohio Dental Association June, 1921.

have the effect of pinching the gum when the denture is brought down to its proper seat. With these points present the patient naturally dodges the issue of mastication. It is very much better, even if the tissues have healed, before attempting to take the impression, to re-open the tissue and remove these points. I had a case of this kind



Fig. 1

Fig. 1—Patient's natural teeth placed in modeling compound impression which was taken before teeth were removed.



Fig. 2.

Fig. 2—Tray with roll of Kerr's Modeling Compound adapted.



Fig. 3

Fig. 3—Impression of bucco-labial portion.



Fig. 4

Fig. 4—Cone shaped mass of modeling compound ready for palatal impression.

recently: Two small roots had been overlooked; after the removal of these two roots and the spiculæ the patient was able to masticate on a temporary denture, and within a period of five months had gained twenty-three pounds. In some mouths you will find through examination of the radiographs a razor-like edge of process, which is char-

acteristically the same as in the case we have just described. It is almost impossible to place a satisfactory denture upon such foundation.

After the tissues have been brought back to position with the fingers, place a roll of Kerr's modeling compound just below the periphery along the labial and buccal borders of a metal tray and bring up to position in the mouth. Sometimes, when the tissue of the lower has been stripped away freely it may drop down on the lingual side; it is better then to employ one or two stitches, even though the splints are to be used. Then some compound is placed upon the center of the tray; this, when brought up to place, has a tendency to bring the tissues on the opposing side of the ridge up into their proper position. Thus from both sides the compound presses the tissues up into the desired position.

Figure 3 shows an impression of tooth sockets and of the crest of the ridge. These impressions of the tooth sockets should be smoothed down even with the crest of the ridge.

We may note here in *Figure 4* how the cone of compound was placed in the center of the tray. The top of the cone is very soft but the base is harder. When this is placed in the mouth, and is pressed to position, it forces the palatal portion towards the ridge. This presses the gum tissue back into place and we shall have a V-shaped slot in the temporary base within which the tissue is held while healing.

Now, we have the impression. You will notice in *Fig. 5* that the impression tray shows through in some places. Pay no attention to this, but take it into the laboratory and pour it with cast plaster. After pouring, we shall have high points sticking up on the cast corresponding to those places where the tray showed through. Take your knife and trim these projections away, also make any minor corrections



Fig. 5



Fig. 6

Fig. 5—Upper after impression of tooth sockets have been cut out.

Fig. 6—Cast of upper—darkened spots indicating where this ridge must be "faked" before base is adapted.

that you may deem necessary. There is no difference in technic in taking the lower except that in the lower we prefer to place the compound on the lingual or inner borders first.

Here in *Fig. 6* the picture of the cast has been blackened to show points at which the plaster ran down upon tray. Upon this cast, smoothed as suggested above, the temporary base is prepared by adapting Graft's, Dentsply, Alston's or similar base-plate material.

Figure 7 shows upper and lower temporary bases. Modeling compound is placed upon the posterior portions of the lower base in the

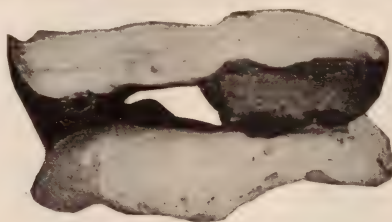


Fig.7—Temporary bases completed.



Fig. 8.

Fig. 8—1 and 1a—These figures show casts of the same mouth. Fig. 1a indicates the additional area that has been incorporated since the first denture (constructed on cast shown in Fig. 1) was made.

molar and bicuspid regions. This compound is warmed and when the patient closes upon it serves as an occlusal rest. Cut away the excess from the sides; this should provide a smooth occlusal surface just high enough to give contact with the upper base when the lips are at rest. We place these in the mouth and the patient will in all probability respond with: "Doctor, that feels fine," for he has a rest for his jaws. The bases do not fit particularly well, but the patient begins immediately to become accustomed to bases, and this psychological effect is of tremendous value.

If desired, teeth may be set up in modeling compound upon these temporary bases.

We desire now to say a word or two with reference to the physical factor, which is a vital consideration in the retention of artificial dentures. One of the very first problems we have to consider when beginning work for the patient is that of the area to be covered by the den-

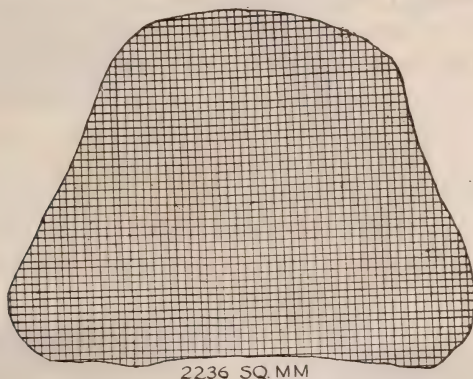


Fig. 9

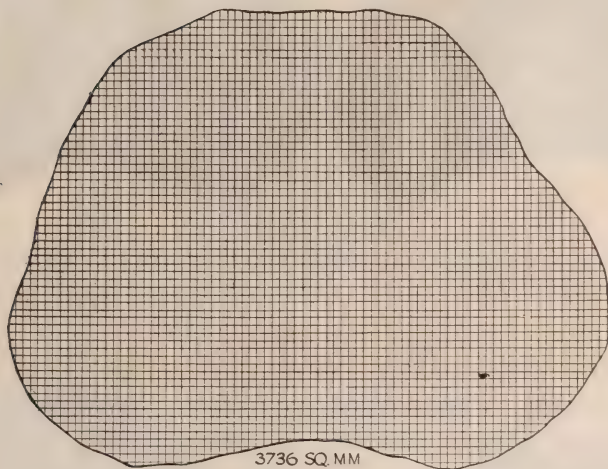


Fig. 10

Figs. 9 and 10 are outline bases of casts shown in Figs. 1 and 1a. These bases are respectively 2236 millimeters and 3736 millimeters in area. They represent dentures constructed for the same mouth and show an improvement in retention of more than 59 per cent.

ture. On the left of the screen in *Fig. 8* you will see the cast made from an impression of a denture which the patient was wearing when he came to us, while on the right you will see the impression, or rather a cast made from the impression which we took of this particular mouth. Notice the difference in areas of dentures constructed for the same mouth. When the first denture was constructed, the tissues of

the mouth were drawn, and there were folds and wrinkles in the cheeks and lips, and at the time the last denture was finished we had distended the tissues in these places. It is very seldom that the patient will allow the dentist to distend tissue at any one time as greatly as he will require. We can do this, however, with a series of dentures.

Here we place 60-gauge tinfoil upon the cast and then remove it and after flattening it draw these vertical and horizontal lines upon it. We get 2236 sq. mm. of surface as shown in *Fig. 9*.

This shows the final result of our efforts to secure added area, through a series of dentures increasing in size until we secured this one with an area of 3736 sq. mm. If I remember correctly, we got an increased surface of more than 67 per cent. and retention was increased in the same proportion. I would urge you in every instance where it is possible, to go out into the tissue, especially in flat mouths, and secure as much surface as the tissue available will permit. Thus the lips

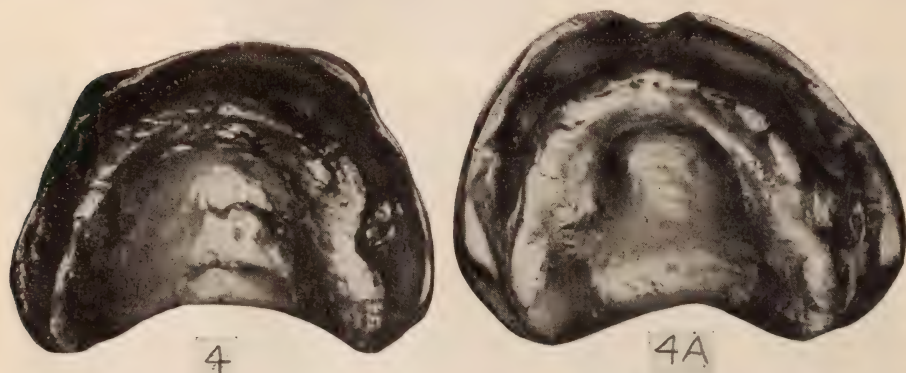


Fig. 11—4 and 4a contrasting original denture constructed for patient with denture worn by same patient three years later. Note area that has been added.

and cheeks will drop down over the borders and serve as a seal, and it is with the utmost difficulty that the patients are able to remove these dentures. Formerly, I encouraged patients to move the dentures by blowing, because blowing distends the lips and cheeks, thus breaking the valve seal and allowing air to enter beneath the base after which the dentures are easily dislodged. However, I have quit encouraging that method of removal, since the day when a patient came into my office and said, puffing away, "Doctor, this plate won't stay up for me." Now, I have them place a finger along one side of the denture near the tuberosity and lift the cheek. This lets the air under the denture, when it may of course be easily removed.

Figure 11 presents a case for which we constructed a gold base denture, and then later another one of gold. I wish to call attention to the increase in area of mouth covered, this particular denture being far more efficient than the previous one.



Fig. 12—Upper and lower compound impressions, showing results of trimming to shape for use as individual trays. The white thread lines indicate limits to which trimming is continued. The whitened spot on the lower indicates the portion that should be cut out so as to avoid pressure upon the mylohyoid ridge.

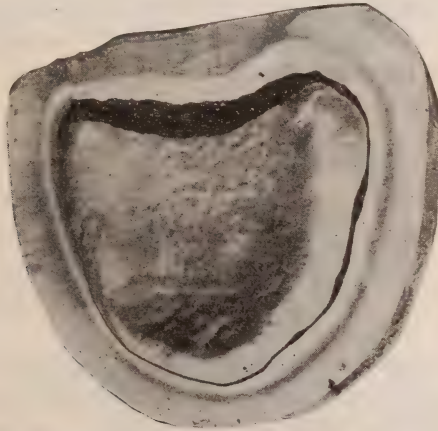


Fig. 13—The black line indicates the portion of the cast which some operators once were accustomed to scrape in order to assure a closer contact.



Fig. 14—Showing black impression trays after Kerr's stick modeling compound has been penciled upon them, and the borders of which through repeated returns to the mouth have been molded as desired.

Just a word about impression-taking. The method we use in our office is the one that we have found most satisfactory; it is one that we like to designate as the Combination Method, since we employ out of three methods, the Wilson, the Green and the Hall, those features which have given us the best results. With a Britannia metal tray and using the S. S. White Compound suggested by Dr. Rupert E. Hall, we secure an impression. The next step is to remove the impression from the metal tray, and this impression becomes now the tray proper. Cut away all of this portion of the compound beyond the roll or at the line where it begins to turn and drill a hole in the base of this improvised tray in the median line as far forward as possible.

Figure 12 shows the Hall compound impression trays. An important factor in taking an impression is peripheral adaptation. We want adaptation over every area, but the border of the impression is most important.

The line drawn upon this cast shows the region along which the dentist formerly was accustomed to use a scraper in order to correct poor adaptation after his method of impression-taking.

After we have made the impression tray of the black compound, we pencil a small layer of Kerr's stick modeling compound all along the periphery and across the posterior portion of the palate. In pressing or massaging the lips to secure the correct height of the periphery, I do not believe in asking the patient to assist because the patient may develop some movement that, when the dentures are being worn, may prove to be a decided menace. Accordingly, we never in any instance request the patient to help us with this.

The prosthetist does not at this stage feel anxious about the adaptation and, if his principles of procedure are correct and adhered to throughout, there is no reason for being anxious at any stage in the construction of a denture. There is no reason at this stage why the impression should stay up as if close retention had already been secured. So, this hole makes it easy to remove the impression and later will serve as an avenue of escape for excess plaster. Psychologically considered, it is very important that the operator shall not show any alarm when the tray drops or is easily dislodged. If he does show alarm, then the patient may think: "You didn't get a good fit. I wonder whether the finished denture won't drop just as easily!" and the fear of the patient with reference to the calamity may contribute to its occurrence. On the other hand, the patient will be reassured to see that the impression may drop during these preliminary stages without seeming in any way to disconcert the dentist. His reaction will then be: "Well, he knows what he is doing. I'll just follow his instructions."

Take carding wax on which the teeth come from the manufacturer, and make a roll about the size of a knitting needle. While it is warm, place it around the border of the impression and place in the mouth

and bring up to position with considerable pressure, making the contact all the way around. On account of the emphasis that I have placed upon the subject of compression I fear that some may get the idea of compression uppermost in their minds and exaggerate it. Do not exaggerate this phase.

Fig. 15—Roll of "card" wax in place ready to be inserted for purpose of securing compression of the tissues.

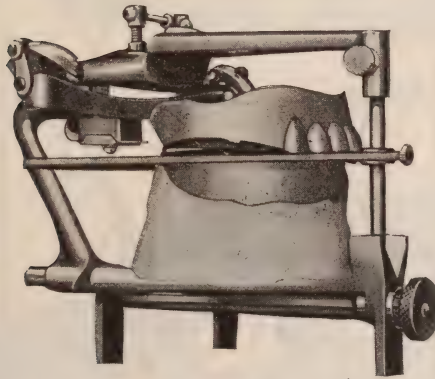


Fig. 16—In mounting casts, the occlusal plane should be parallel with the jaws of the articulator. The Gysi articulator is manufactured with marks that indicate proper position of casts.

We have constructed occlusal rims, secured central occlusion and mounted the case on the articulator as we see here. This is a Gysi Simplex articulator with an attachment which enables you to secure a definite angle of the tooth cusps. Next to Dr. George Henry Wilson, Dr. Rupert E. Hall, more than anyone else, has enlightened me along prosthetic lines. Dr. Hall several years ago, at the National Association meeting in Rochester, expounded the theory which relates the location of the rotation point to the equilateral triangle when reversed upon itself, that is, when it takes the position of one equilateral triangle erected upon the base of another equilateral triangle. The rotation point is located at the apex of the triangle farthest removed from the anterior apex. While this is true of his articulator it is purely fanciful

when applied to the human mandible. *The* rotation point is a theoretical conception and for practical purposes is non-essential. It is differently located in different persons. In the Gysi articulator we find two rotation points. When the jaw moves to the right it describes a segment of one circle, and when it moves to the left the segment of another is described. This little arch formed by the meeting of these segments is known in prosthetics as the Gysi Gothic Arch. When the jaw is protruded, all of the area that the lower jaw is capable of covering may be shown by drawing a straight line connecting these segments.

While Dr. Gysi's articulator may not grind any but the surface corresponding to that of the Gothic arch, Dr. Hall's will grind also that

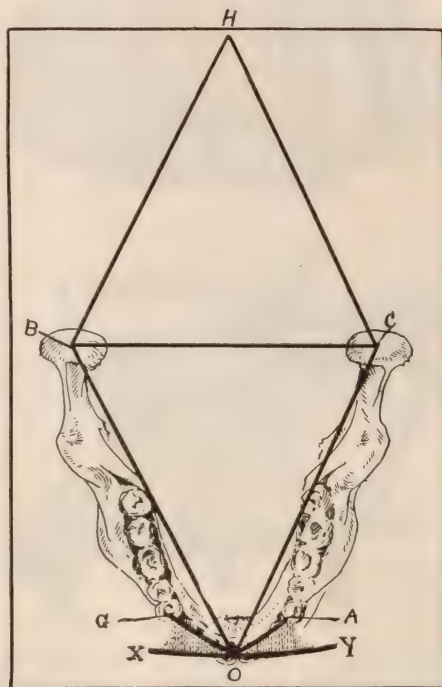


Fig. 17—Diagram showing that articulators capable of describing arcs of small circles are as efficient as an articulator capable of describing a complete circle. The masticatory movements of the jaw cannot avail themselves of the larger range of movement indicated by dotted area.

corresponding to the area between the Gothic arch and the arc of a circle whose center is located at a point corresponding to a point in the region of the occipital protuberance. An articulator with one rotation point will describe an arc of one circle, and the area of the surface included in this segment may be larger than the area included within the Gysi Gothic arch. In comparing movements of the Gysi and Hall articulators this may be easily demonstrated

This is one of the reasons why a denture constructed on a Hall articulator with the one rotation point is eminently satisfactory. Any articulator will serve satisfactorily if it grinds surfaces corresponding

to all of those which the jaw is capable of grinding. Because an articulator may be able to cover surfaces which are greater than those possible for movements of the jaw, is no indication of a relatively greater superiority. Remember that the extent of the movements of the jaw is limited by the ligaments. It can only move within the limitation of those ligaments. That is one reason why we have had fairly good success before we knew anything about rotation points.

In the laboratory there should be no occasion for opening or closing the bite. The operator should get the desired relationship between

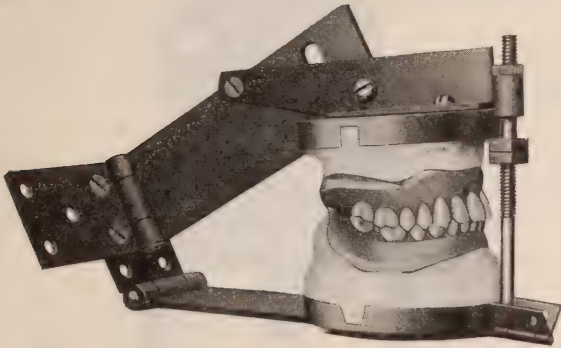


Fig. 18—A crude articulator constructed of two barn-door hinges, bottoms of two flasks, and using cabinet-door hinge for guide cup and a bolt for guide pin.

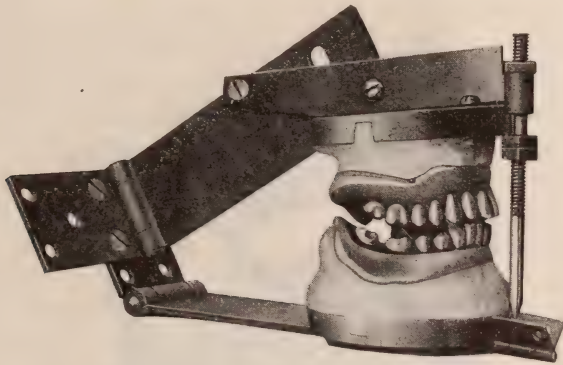


Fig. 19

Fig. 19.—Showing same articulator as Fig. 18, but showing lateral movement affording desired contact.

upper and lower at the time he secures central occlusion in the patient's mouth. One good reason for the use of the face-bow is to enable the operator to correct in the laboratory the mistake that he made in the operating room when he endeavored to get the proper relationship of the upper and lower jaws.

Here is an articulator that I made of barn-door hinges. It will do the same practical work for us as any of these others. The rotation point was not determined by measuring anything; no hypothetical triangles were involved nor were measurements of mandibles or condyle

paths. We run the guide-pin up and grind the cusps' surfaces to some definite relation, so that when placed in the mouth they will have this same definite relation. We can grind them to the desired relation on this just as correctly as on any other. I do not believe they can show us one that will do it better. They use an ultra-scientific instru-

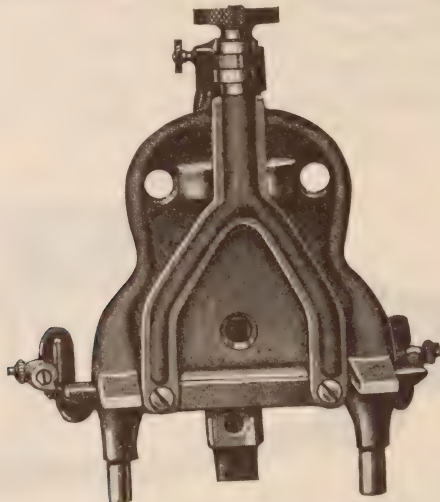


Fig. 20

Fig. 20—Lower portion of attachment for the Gysi Simplex Articulator.

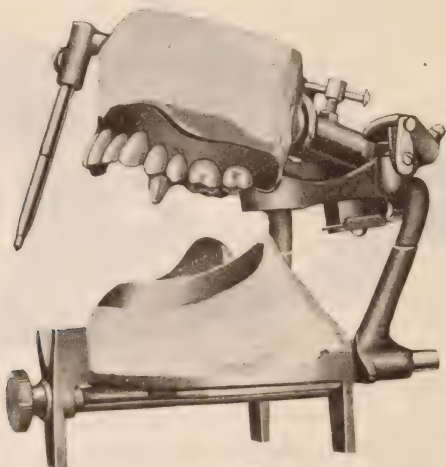


Fig. 21

Fig. 21—Showing the second lower bicuspid ground to minute articulation, and sealed with thin film of wax ready to assume its correct alignment on the base.

ment for doing something which the jaw does not do ultra-scientifically.

Here is the articulator with a case in lateral occlusion. It shows the extreme curvature set-up as given us by Dr. Hall. With dentures constructed by the Hall method, I believe the tendency is for the patients to shear the food rather than triturate it.

This shows the lower portion of the attachment shown in *Figure 16* as part of the Gysi. It has also been fitted to the Kerr and to the Snow as well. This attachment fitted to these articulators embodies all of the ideas which your essayist regards as essential in a thoroughly efficient yet very simple articulator. It may be of interest to know that the descriptions and claims filed in the patent office in connection with applications for patents on articulators usually state that the articulator will reproduce movements of the mandible. The patentee of this attachment does not state that it will reproduce movements of the mandible, but he does say that any mandible will reproduce the movements of the articulator.

I believe that this slide will be of interest. It shows how easy it is to set up the teeth in connection with a simple method of securing central occlusion. We place these anterior teeth in the mouth before the bite is taken or better said, central occlusion is secured. After securing it, we remove the case to the laboratory and set up all of the posterior teeth. After we have the upper teeth in position as we want them, we take a drop of wax and stick this lower second bicuspid in position between the bicuspids above. Close the articulator and with a little wax seal it to the lower base, after which you release it from the upper with a small flame projected by a chip-blower. After you get the upper ones set up the lower ones almost automatically assume their correct position.

I wonder how many of you are using flasks so loosely constructed that when you put the upper part upon the lower there is a sixteenth or an eighth of an inch movement possible. The parts of the flask should be so mechanically exact that it is impossible to put them together except in exactly the one relationship. So far as your essayist is aware, there is but one flask on the market which meets this requirement after several months' use. It is the flask designed by Dr. Victor H. Sears, of Salt Lake City, Utah. If it is possible with the old style flask to pack the case and then, when separating, to move the parts as much as two millimeters out of the original position, that will cause you trouble and will warrant you in throwing the flask away. Do not pack the case with too much rubber at first; be sure that there is not enough. Add rubber as needed until finally there is just enough. Open the flask one or two or even three times, and if you finally should have a little excess, cut it away. Formerly we were accustomed to put great pressure upon the flasks but my associates now stand upon them and we find that this weight of 150 to 175 pounds is sufficient to close them. Until we found this out we had been using as much as 2000 pounds pressure.

After the case is completed, ready to be placed in the mouth, the construction of a scientific denture has only just begun. How many of us stop at this point? This is where we should begin to construct an artificial denture that will serve as a masticatory substitute. Take

the black wax upon which the teeth are carded by the manufacturers and after warming it slightly, make a roll about the size of the little finger, flatten it out and lay it upon the lower denture. (I want to say a word for the manufacturers of adhesive preparations. Right here is the psychological moment to use some of that powder. Dust some of it in the upper at this time. I do not care to have the patient raise the question as to whether the case is going to stay in position, so we sprinkle a little of this in, and the upper stays in place. We also in many instances find it wise to give the patient a small can of it and tell him to use it for a few days. The patient will use it two or three times and then will find that the denture stays just as well without using it. Then he will discontinue it entirely just to show us that he can wear his dentures without it.)



Fig. 22

Fig. 22—White spots indicate the porcelain showing through at these points after bite has been taken.

First place the upper denture in position, then after warming the wax, the lower. Have the patient close; then have him open and you may remove the case. You will be happily surprised if you find that you have as many as two or three points of porcelain contact, where the teeth have gone through the layer of black wax. If you have four or five, you are an expert in packing. Should you get but one point of contact, mark it with an indelible pencil and cut out the corresponding part of the opposing tooth. Never cut the cusp off; instead, cut the sulcus deeper in the opposing tooth, because if you cut off the cusp, this area will not be effective for triturating purposes. This deepening of the sulci will preserve contact in the lateral relation and also contact in central occlusion. After grinding out this first point of contact return to the mouth and repeat the operation with the black wax. This will permit another point of contact to appear and repeated operations will enable you to obtain at least three points of contact; then you remove the case and lute it to the articulator. Remove the black wax, close the articulator, and you will have a wonderful surprise in store for you. A case that seems to have good occlusion in the mouth, will, when mounted on the articulator, show some glaring defects in

occlusion. Mix No. 90 carborundum powder with glycerin and put it upon the teeth of both upper and lower, using the left hand in applying it. Do not apply the paste with your right hand, because you will require the right hand for moving the articulator in grinding. We use glycerin instead of oil because it is soluble in water and consequently easily washed off.

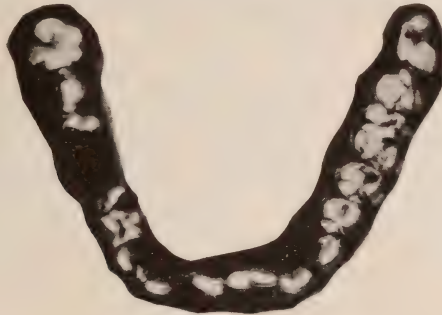


Fig. 23

Fig. 23—A piece of base-plate wax showing imprints of natural teeth (one tooth missing) in final masticatory movement.

This is a photograph of pink wax through which my own teeth came into contact.



Fig. 24

Fig. 24—Same as figure 17, but showing the "bite" of artificial teeth after they have been automatically ground on the new attachment.

This shows contact through the wax of properly-ground artificial dentures; it shows a contact which is highly desirable in artificial dentures.

For a number of years I have been using large molars and bicuspid wherever possible, but I believe that in a large number of instances the large molars and bicuspid are ill-advised; with the tender tissues of some mouths and the small area covered by the dentures, it is impossible for the patient to push the lower masticatory surfaces through food into the upper.

In many instances much better results are obtained through the use of small teeth which have smaller occlusal surfaces. Whenever you desire the esthetic effect that may be secured with the use of a long bicuspid, you may properly grind the occlusal surface since you cannot get a long bicuspid without getting a large occlusal surface. After the removal of the wax, the carborundum and glycerin paste is applied, as I have explained, and you begin to grind first one side of the case and then the other. Grind it until satisfied that the case is correct. With this screw which provides the antero-posterior movement you bring the teeth forward, and very often you find that the anterior teeth do not touch. This is due to a high point in the molar region. Grind that out, using carbon paper to mark it until ground down, and continue to apply the carborundum and grind until it has disappeared. Then grind the others until you have contact with the molars and with the anterior teeth. Then give the screw two or three turns and grind some more, then turn two or three turns and grind again. Continue until you are able to grind in to central occlusion.

729 Shukert Bldg.

Success

"He has achieved success who has lived well, laughed often, and loved much; who has gained the respect of intelligent men and the love of little children; who has filled his niche and accomplished his task, whether by an improved poppy, a perfect poem, or a rescued soul; who has never lacked appreciation of earth's beauty, or failed to express it; who has always looked for the best in others and given the best he had; whose life was an inspiration and whose memory a benediction."

THE PSYCHOLOGICAL LAW OF ANESTHESIA

BY BERNARD FELDMAN, D.D.S., PATERSON, N. J.

(Written for THE DENTAL SUMMARY)

(While not necessarily endorsing any of the deductions of the author of this series, the Editor and publishers believe that, in the interest of the advancement of science, the work of all sincere investigators is deserving of consideration by the largest possible group of intelligent men and women. It is in this spirit that space is devoted to these articles by Dr. Feldman, even though they may be considered by some as rather remotely related to dentistry.—G. E. H.)

1

INTRODUCTION

DEDICATED TO TRUTH, than which there is no greater religion nor science, this treatise should be welcomed by its readers who are as professional men altruistically devoted to the welfare and betterment of the human race. It proposes to discuss mainly the topic of consciousness in its relation to anesthesia. Upon hasty thought, this may be considered by the average reader as being too "deep" to maintain his interest; yet, upon more mature reflection, anyone who is interested in the safety of the man or woman entrusted to his hands, should be very much interested in this presentation. Such a reader will follow every argument, while the attempt is being made to combine or to dove-tail the facts which already have been accepted by exact science, with the psychical and super-physical facts which recently have been advanced by the newer sciences. Facts should be considered on their face value, and whether they are of a chemical or electrical or psychical nature, is secondary to the all-important consideration that they all belong to Truth. It ill behooves our scientists to ridicule or to belittle *any* facts just because they have not yet found a rational explanation for them.

Such are the psychical phenomena which have been taking place for untold centuries. Because they deal with unseen and super-physical forces of Nature, they have been frowned upon by exact science and considered as miraculous by the superstitious and ignorant rabble. The one attitude is as unreasonable and unworthy as the other.

Let it be emphasized, that *there is no miracle*. Everything that happens is the result of law—eternal, immutable and ever active. When certain things happen unfailingly as the result of certain conditions, science should consider this sufficient reason to examine into these unfailing manifestations, and to postulate a law or theory that may possibly govern them. If given a fair and impartial examination, these unseen and seemingly supernormal phenomena (termed "psychic" because they deal with mind), will prove themselves subject to natural laws just as much as the unseen atom and molecule or the unseen gravitation which form the basis of the grand sciences of chemistry and astronomy. No one ever has seen or isolated the atom, and it is possible that no one ever may, because it seems to be beyond the reach of our

finite senses. Yet everything happens in chemical science just *as if* the atom were real, because of its manifestations. This is no less true of *all* natural forces which are subject to natural laws. Recently, the atomic theory and the gravitation theory have been subjected to amendments or corrections; the electron is supplanting the atom and gravitation is being considered as attraction and repulsion. If these two theories do not contain the whole truth, they at least embody enough of it to permit of the great advancement to be made in these sciences, where chaos and uncertainty had ruled before.

A similar condition of chaos existed in the psychical phenomena already mentioned; and added to the confusion, are the cries of supernaturalism and what not. This condition is changing, slowly but surely. About twenty-five years ago, Dr. Hudson gathered the facts which have been accumulating through the centuries, and boldly rearranged them into a logical and orderly sequence which he embodied in a book entitled¹ "The Law of Psychic Phenomena," which is being used today as a standard text-book by the leading universities of this country. Other writers had preceded him in the presentation of many grand truths, yet it was while reading this book that the writer was struck forcibly by the frequent mentionings of anesthesia, which seemed to be an accompanying feature of innumerable psychical phenomena in which *no drugs or narcotics were used*. The more books which were thereupon read upon the subject, the more apparent it became that we have here a subject of vital interest to the dental and medical professions, and one that is worthy of further study and elaboration from an entirely new view-point.

This view-point involves certain vital or psychic factors, which have hitherto been almost entirely unmentioned by our leading authorities on the subject of anesthesia while they have been studying the pharmacophysical-pathological factors.

The aim of this series of articles is to present these facts in an orderly and scientific manner, so that out of the chaos which now exists in the science of anesthesia, there may arise an order and a decorum which will assist it to take its place as a dignified science amongst the existing grand sciences.*

2

HISTORY

Anesthesia is the entire or partial loss or absence of feeling or sensation; a state of general or local insensibility, produced by disease, by hypnotism, or by the inhalation or application of an anesthetic². The first mention in the Bible of "the deep sleep" which the Lord God made to fall upon Adam is an indication to the religiously orthodox of its divine origin, showing God to be our first anesthetist and surgeon.

*(NOTE—The metaphysical phenomena of one age or period become the physical phenomena of the next. Things and states of consciousness that seem mysterious today will be the common-place fact of tomorrow.—G. E. H.)

¹T. J. Hudson, "The Law of Psychic Phenomena."

²Webster's Dictionary.

To the scientific mind, it is at least an indication of its antiquity. Even if the story is an allegory, the record remains that this psychic causation of an anesthesia which was deep enough to permit of the removal of a rib of man, was known to the writer or writers of the Book.

Since the discovery of anesthesia by the inhalation of ether and nitrous oxid, which is essentially credited to the dental and medical professions of the United States through the pioneer work of Crawford W. Long, Horace Wells, Wm. T. Morton, and Chas. T. Jackson, this type of psychic causation of anesthesia has been gradually forgotten by science. Yet we have undeniable testimony from the published records of innumerable cases, that a satisfactory anesthesia, for surgical purposes by men of the best scientific standing, was obtained by hypnotism, *at least fifteen years prior* to these epochal discoveries in America. Dr. Bernheim in his book "Suggestive Therapeutics" (page 116), says:

"The use of hypnotism for the production of anesthesia for surgical purposes is by no means a new thing. Dr. Charpignon reviewed the following facts, relative to operations practiced during hypnotic anesthesia, in the "*Gazette des Hopitaux*," in 1829: The removal of a breast by Jules Cloquet in 1845; in 1846 the amputation of a leg, and the extirpation of a gland, painlessly performed by Dr. Loysel, of Cherbourg; in 1845, a double-thigh amputation by Drs. Fanton and Towsel, of London; in 1845, the amputation of an arm by Dr. Joly in London; in 1847, the removal of a tumor of the jaw by Drs. Ribaud and Kiario, dentists, of Poitiers."

Dr. Bramwell, of England also reports⁵ that in Dr. Elliotson's time (1840-1856), mesmerism frequently was employed as a means of inducing anesthesia for surgical cases and operations in England. The most remarkable series of painless mesmeric operations were those performed by Dr. Esdaile in Calcutta, India, about 1845. Records of these cases are to be found in the Governmental reports, in Esdaile's published works, and in the pages of the "*Zoist*," a magazine long out of print. They comprised, as stated, nearly three hundred capital operations and many thousand minor ones. Among them are mentioned the removal of an immense scrotal tumor weighing 103 pounds, the removal of a large tumor in the antrum maxillare, leg amputations, strangulated hernia, etc⁵.

An operation lasting twelve minutes (removing a cancer from the right breast of a Madame Plantin) is reported in the *Bul. de l'Acad. de Med.*, tom. 11, page 370, "*Archives Generales de Medecin*," page 113 Paris, 1829. During the whole time of the operation, the patient talked quietly with the mesmerist and never felt the slightest sensation. ³⁵.

⁵J. M. Bramwell, M. D., "Hypnotism."

³⁵H. P. Blavatsky, "Isis Unveiled"; "The Secret Doctrine."

The use of hypnotic anesthesia for the extraction of teeth and other dental operations seems to have been common at all times⁵.

3

VARIOUS THEORIES

A more detailed account of the history of anesthesia will be found in the first chapter of Gwathmey's excellent text-book on "Anesthesia"²⁵. The second chapter of the same book gives a brief yet well-condensed version of the various theories that have been presented by scientists to explain the phenomenon. Lillie claims that it appears beyond doubt that the anesthetic is in solution in the blood during the narcosis, and that the plasma membrane undergoes a physico-chemical alteration. Overton and Meyer claim that the narcotics act by dissolving in certain substances contained especially in the nerve cells. These substances are the lipoids, especially lecithin and chlorestrin, which appear to be essential constituents of protoplasm. Nerve cells have probably a high lipid content. Verworn's theory is that the manifold paralyses classed under anesthesia are due to the disturbance of the oxygen metabolism, making anesthesia equivalent to asphyxiation of the tissues. Claude Bernard says that a semi-coagulation of the protoplasm is produced, the protoplasm resuming its previous state upon the removal of the anesthetic²⁵. Mathews²⁷ claims that oxidation takes place following a molecular rearrangement; the anesthetic produces anesthesia by occupying the oxygen receptors of the cell, thus forming a non-irritable, dissociable, anesthetic, protoplasm compound.

Further discussion of these and other theories is not advisable in this discourse, other than to remark that all these men hold to a chemical or to a physico-chemical explanation of the phenomenon. No direct mention is made by any one of these men of any vital or psychic factor that may be involved. (*See foot-note No. 1*). They practically com-

Foot-note No. 1—In fairness to Prof. Lillie of Woodshole, Mass., whose researches in the physiological aspects of anesthesia have made him widely known, it must be noted that he mentions²⁶ that anesthesia "may be classed as one of the vital processes of life, which are subject to reversible arrest." He does not go beyond physiological means to explain the phenomenon, claiming:

A—That anesthesia's essential basis is to be sought in some cellular physiological modification which is capable of being intensified and prolonged by the use of certain agencies.

B—That mechanical, thermal, electrical and chemical conditions may effect externally certain cell changes to produce anesthesia.

C—This cell-change consists of a *surface-change*, in which the plasma membrane is the special sensitive intermediary which is directly influenced by anesthetics. The latter appear to exert a stabilizing action on the plasma membrane, rendering it more resistant than normally to influences that increase its permeability.

D—That anesthesia is to be regarded not as an essentially abnormal phenomenon, but as an intensification of a normal physiological condition whose essential basis is to be sought in the normal inhibitions shown by all living cells.

²⁵Gwathmey's "Anesthesia."

²⁶Lillie, Year Book of Anesthesia for 1915.

²⁷Mathews, "The Residual Valence of Anesthetics."

pletely ignore the fact that anesthesia has been obtained in innumerable cases as already mentioned, *without the use of drugs*. Surely no chemical theory can hold tenable in these non-chemical and purely psychic or hypnotic manifestations. The chemical explanation of them must be abandoned, and another theory may be advanced to cover these latter cases.

In advancing such a theory that will cover *all the factors*, including particularly the psychical or vital factors, the writer is in perfect accord with the point of view which is readily held among physiologists which *recognizes the human organism in its completely organized unity to possess both its physical and psychical aspects*. Each one alone gives only an incomplete and partial representation of the whole reality; and if this is so, it is not difficult to see that a modification of either the physical or the psychical may influence the whole vital process. The realization will come to the reader that there must be some relation between the anesthesia accompanying sleep, hypnosis or similar conditions and that produced by chemical substances (narcotics) introduced into the organism from the outside.

4

CHEMICAL VERSUS VITAL CHANGES

An idea has been advanced as long ago as 1850 by Dr. J. B. Dods,³⁰ which may eventually change the views held at the present time by medical science regarding the action of drugs upon the living organism; the resulting manifestations of which have been attributed to chemical instead of *vital* action. For instance, the *effects* of an acid *upon* the nervous system were noted, rather than the *reaction* of the nervous system *towards* and *upon* the acid poison. *The drug is always acted upon; is never that which acts*. The system makes strenuous efforts to undo the poisonous effects of the irritant. The chemical changes and combinations which the drug may undergo in the system, in certain rare cases, is an altogether different thing from *vital changes*, and are from a different plane. Chemical changes may, and of course, do, take place in the body, in addition to the vital changes, but it is *never* the chemical changes which we perceive, *always* the vital changes, which ultimately rule and govern the body. Vital and chemical action may take place in the same body—yet their action is always separate and in no wise necessarily inter-related.²²

We must bear this important point in mind, because anesthesia is considered to display one of the vital processes of life which, as Lillie²⁶ says, "are subject to reversible arrest," just as are amoeboid movement, protoplasmic rotation in plant cells, phagocytosis, etc. Just as the vitality of the organism expresses itself upon the proper occasion in phagocytic action, similarly does anesthesia constitute a *vital response* upon the part of the organism, in which chemical, physical, electrical

³⁰Dr. J. D. Dods, "Electrical Psychology."

²²Ragbliatti, Preface to H. Carrington's "Vitality", etc.

and other physical processes may play a secondary role in conjunction with the primarily important *vital* or psychical factors.

We must not confuse the *chemical* with the *vital* changes that are involved in the phenomenon of anesthesia. We must conclude after careful study, that Nature endowed the human cells with a self-protective power which we must class with its other vital attributes, such as feeling, nourishment, etc. This instinct of self-preservation which has been called Nature's first law, is a wonderful contribution of an Infinite Intelligence which cannot be explained upon purely chemical or physico-chemical grounds. When we combine these with the vital or psychical factors which emanate from the Infinite Mind, then only do we come nearer to the truth. Can anybody explain perfectly the mysteries of reproduction, of phagocytosis, or of any of the many vital functions of life? We can only notice and record Nature's manifestations which invariably take place with systematic precision under natural laws. The ultimate how and why belong to the Infinite.

5

VITAL RESISTANCE

The same rule applies to all reacting substances which, like the afore-mentioned drugs, are irritants to the organism. Such an irritating influence is exemplified in bacteria and their toxins, which do not act of themselves, *but which cause the body to react towards them*. Each kind of germ may cause certain characteristic reactions upon the part of the organism, and these are known as "symptoms"; the disease which follows is really Nature's method of curing the affected cells. Yet, we know that the germ itself plays a secondary role, and *unless* the predisposition is present in the form of *lessened vital resistance* of the tissues which, thereby, furnish a pabulum for the germs to feed upon and flourish, the germ can do little if any harm.²²

What do we mean by vital resistance?

Ragbliatti²² says that it is a form of energy which has a common source from a common Author, manifesting itself in its lowest form as substance and ascending in the scale to liquids, then to gases, then to crystalline forms, then to chemico-dynamic bodies, ethereo-dynamic bodies, then to plant *life*, animal *life*, and finally human *life*. Hereward Carrington²² considers vitality to be a separate and distinct force, *per se*, derived from the Cosmic Energy which pervades the entire world.

As we examine the densest substances in existence, we find that they are the most difficult to move, and hence must be the greatest possible distance from inherent motion. Water is more easily moved than earth; air is more easily moved than water; the gaseous fluids are more easily moved than air; electricity is more easily moved than the gaseous fluids. Yet none of these possess inherent motion. As we mount the rounds of the ladder in the magnificent scale of material substances, there is a gradual approximation towards inherent motion; by mounting one or more steps higher we must come eventually to that

substance whose nature it is to move. *This substance is Mind.**** It is sublime and eternal; it cannot be seen nor weighed; travels twelve million miles per minute at least; it is the essence that radiates from the Supreme Being. It is substance which possesses the attributes of self-motion and living power. And the final link in the complete chain, from which everything finds its source, is the *Infinite Mind*.³⁰

The occultist† would express the same thing as follows: Spirit emanates from the *Infinite Mind*, and as it passes through the various planes or phases of existence, which are seven in number, it gradually becomes coarser and more tangible as it goes further from the Source, until it reaches this earth as matter. So that Spirit is matter in the seventh plane; matter is Spirit on the lowest point of its cyclic activity.

Mind‡ is the sum total of all substances in being, in its absolute perfection, and absolutely disposes of and controls all. It cannot, however, come in contact with matter except through its agent, "electricity," which thus becomes the connecting link between *Mind* and matter. By it, *Mind* gives it motion and arms it with power, and through this unseen agent, moves the universe and carries on all the multifarious operations of Nature, whether minute or grand.³⁰

To distinguish Man in a manner that would enable him to rule over all other animals, the *Infinite Intelligence* imparted to him a part of His own essence, *Mind*, and gave to protoplasm that indefinable something which is called *Life*, and the powers of life, one of which is motion. Scientists can, if they wish, try to discover the source of this Cosmic energy; if they continue to deny the existence of spirit, their efforts will be in vain. Without this principle of *Mind*, which links the human being with the *Divine Intelligence*, he would surely be no better than animal or beast. It is this Manas-Soul which St. Paul called the Quickening Spirit, that radiates directly from the Divine Mind and makes the human being immortal.

6

MIND VERSUS MATTER

The latest advances in the great sciences are only confirming this great truth that the Universal Source, or the Divine Will, caused everything visible and invisible to spring into existence out of the one single primordial substance. Svante Arrhenius' achievements in ion-chemistry have their essence in the assumption that all chemical action is electrical. Sir J. J. Thomson's name is everywhere associated with the unit particle of negative electricity, the electron, which is in mass about seventeen hundred times smaller than the atom of hydrogen. *The electron is, in a sense, the meeting point between Mind and Matter, and there is some reason to think that the electrons are the sole constituents*

***This energy must not be confused with the human "mind" which latter relates to the functioning of the mental faculties in animal beings and Man.

†(The occultist is one who sees in external phenomena the visible effects of unseen causes, and searches for these causes.—G. E. H.)

‡(Another name for this "Mind" is *Consciousness*.—G. E. H.)

of *matter*, which is the same thing as saying that an invisible substance, electrical or electrional in nature, is the basis of Matter. Atoms fill the immensity of Space, and by their continuous *vibration* are that motion which keeps the wheels of Life perpetually going in perfect harmony.

Motion is the root of all. Life is motion; consciousness is motion. And that motion affecting matter is vibration. This infinite motion appears as rhythmical movements in the matter which manifests it. When motion is regular or rhythmic, it means health, consciousness and life; when it is without rhythm, it means disease, unconsciousness and death. In physical nature, we mark off the different ranges by different names, calling one set *light*, another set *heat*, another *electricity*, another *sound*. Yet all are of the same nature; all are modes of motion in ether, though they differ in velocity and in the character of their waves. Roentgen's rays, Lenard's rays and Finsen's ultra-violet rays are simply manifestations of electrical energy, consisting of electrons, and which differ from ordinary light only in the length of the waves. Light vibrations affect our eyes; there is another ether which is much subtler and which is responded to by the *mind* when it is thrown into vibration. We call this motion *Thought*.³⁶

We thus see that facts are piling upon facts with every advance in science, which serve to fully demonstrate the universality of energy, the scientific name for *Mind*, and its agent called Cosmic Energy. And the Author of all is the *Infinite Mind*.

7

THE PSYCHIC NATURE OF MAN

When Man received the wonderful endowment of mind and intelligence from his Divine progenitors in what occultists call the Third Round (or cyclic period) of this world's evolution, millions of years ago, it necessitated the supplying of organs with which to make use of these divine attributes. And as Man passed through many subsequent evolutions and gradually used his mind and intelligence more and more, these organs assumed their present characteristics due to this constant functioning. While Man thus possessed a wonderful body or aggregation of living cells, every one of which cells was endowed with intelligence and other vital attributes, this whole arrangement was provided with a no less wonderful organ, the throne for this mind, that wonder of wonders which we call the *brain*. Not that He neglected a single thing, for the vital fires which are sparks of His essence are in all things, and not one atom is devoid of them. In some objects, the various "fires" are latent and in others they are more active. Not all Life and consciousness are similar to those of human or even animal beings, to whom He gave this nervous mechanism, the *brain*. From the amœba, one of the lowest type of animal organism, up to Man, the highest, this property of thinking and of intelligence is inherent in them,

³⁶Annie Besant, "Lectures on Psychology."

and He shaped the bodies of all living creatures to correspond with their brain. Thus, the *amœba* has no nervous system at all, yet it possesses all the attributes of Life. It is the best proof we have that all cells are *Mind* organisms, because there can be no living protoplasm, no *Life*, without *Mind*. As we rise in the scale of animal life, we gradually obtain a more elaborate nervous system, and in Man we reach the greatest one of all. (See foot-note No. 2.)

It is an axiom of science that every cell in the human body is endowed with the potentialities of manhood, and possesses the powers of nourishment, feeling, locomotion, memory and reproduction. The cell has been defined as a nucleated mass of protoplasm endowed with the attributes of life. One of these attributes concerns the transmission of sensations and intelligence from the physical contact which each cell has with the others by means of filaments of living protoplasmic matter. That these filaments can be retracted is well known to every histologist, for they are a part of the living protoplasm of the cell. Beginning with the ovum, from which all the cells of the body develop, and owing to an organic evolution which may have taken millions of years, these cells have become modified and differentiated by environment and function, until today we find the organism of Man to be composed of thirty or more different species of cells, each possessing its special function. The epithelial cells that secrete the skin, nails and hair are organisms which have become perfected with reference to the secretion of protective parts. Similarly, *the nerve-cells are organisms that have been perfected with reference to psychical attributes.*—(Binet).

While each cell in the body has its special function, it has nevertheless retained all, or nearly all, of its primitive properties.¹² Each cell is endowed with an instinctive knowledge of all that is essential to the preservation of its own life, the conservation of its energies and the perpetuation of its species. *Each cell in the body is endowed with Intelligence; each cell is a Mind-Organism.*⁸

Foot-note No. 2.—“The simplest types of animal organism, e.g. such protozoans as the *amœba*, possess no nervous system at all. In certain of the lower metazoans, nerve cells appear with fibers extending towards the periphery of the body, possessing sensitive terminations. Among the *cœlenterata*, a very simple nervous system comes to light. In hydroids, this is merely a kind of tissue of nerve cells. In *echinoderms*, (star-fish) we meet with a more definite arrangement of nervous structure. But it is not until we reach such forms as worms, that we find a definitely-organized center of control, like the brain or spinal cord. In the *annulates* of the worm forms, there is not a center corresponding to a very rudimentary brain, but one roughly corresponding to a spinal cord. In the *molluscs*, the development is made more complex by the appearance of these groups of central cells clustered together in several directions about the brain. Even in the lowest forms of *vertebrates* (the *acranial amphioxus*), we find both a brain and a cord. Passing from the lowest forms to the highest *vertebrates*, for example through the fishes, amphibians and reptiles to the birds and mammals, we meet with every shade of variation in the development of the several parts of the nervous system. Everywhere, however, from the primitive metazoan up to man, the general principle is one and the same—a mechanism for connecting sensitive receptive organs with muscles and glands.” JAMES ROWLAND ANGELL—“*Psychology*”

¹²Dr. Knight Dunlap, “*Psycho-biology.*”

⁸T. J. Hudson, “*The Law of Mental Medicine.*”

These mind-organisms are controlled and directed [in their work by a central intelligence resident within the organism, designated by Dr. T. J. Hudson, the eminent psychologist, as the *Subjective Mind*, as distinguished from the Objective Mind.¹ ††

8

DUALITY OF MIND

The laws of the accepted science of psychology teach us that we possess two kinds of consciousness, or duality of mind, called the "objective" and the "subjective," (or subconscious). The objective mind controls the cerebral brain, and takes cognizance of the objective world by means of the five objective senses. The subconscious mind is that intelligence which manifests itself in all subjective states when the objective senses are partially or totally asleep. Thus, for the time being, "Mind is not," because the organ through which the Ego (the Self) manifests ideation on the material plane has temporarily ceased to function.

Duality of mind presupposes a dual nervous system, *i.e.*, the cerebro-spinal system and the sympathetic (or visceral) system. The former refers to the voluntary movements of the body, and is controlled through the cerebral part of the brain. The visceral (or sympathetic, or autonomic) system presides over all the involuntary movements of the body, such as nutrition, secretion, vaso-motor action, reproduction, etc.

As the latter is important in our discussion, we will discuss it in greater detail. Knight Dunlap's "Outline of Psychobiology," pages 95-96, furnishes a very concise exposition, and the reader is referred to it for the general anatomy which involves various sets of nerves, various plexuses and sets of ganglia. Its center of activity is the so-called solar plexus or the "abdominal brain." "In using this term," says Dr. Robinson, "I wish to convey the idea that it is endowed with the powers and phenomena of a great nervous center".⁸

In tracing the ancestry of Man backwards to the first manifestations of life and mind, we find that the subconscious or subjective phase of mind antedated the objective mind by millions of years.⁸ Cases are on record of people with no corpus callosum, or with parts of the cerebrum missing or severely injured, yet these people are known to have lived, some even comfortably.¹⁴ Occult science further claims that Man in his first stages of development was more psychic than material.

These facts would place the objective brain secondary in importance to the nervous mechanism controlling the vital functions of life, known to psychologists as the *subjective mind*. The latter seems to include the medulla, together with the commencement of the brain as far as and including the origin of the cranial nerves, the spinal cord, its thirty-

††(There is, of course, but *one* mind. It would be entirely correct to speak of the objective and subjective (or sub-conscious and even *super*-conscious) *phases* of Mind.-G.E.H.)

¹⁴Christison, "The Brain in Relation to Mind."

one pairs of nerves, and the visceral nervous system. It follows that the rest of the brain is a product of organic evolution to serve a purpose for which the subjective mind was not adapted beyond its control of the functions, sensations and conditions of the body. This part of the brain has become the organ of the *reasoning* mind, after secondary instincts were developed in Man through the centuries. The struggle in the "survival of the fittest," meant, for Man, to overcome, through his reasoning powers, the changing environmental conditions to attain supremacy over the animal kindgom.

Reason, that works through the physical brain, develops at the expense of Instinct, the flickering reminiscence of divine spirit. Reason, the badge of sovereignty of physical man over all other physical organisms, is often put to shame by the instinct of an animal.³⁵

The subjective mind which is the vehicle of instinctive response, can invade and usurp the functions of the cerebro-spinal system under certain conditions not yet fully explained. As, for instance, when the body is in imminent peril of death, the objective mind functions too slowly and the nerve responses are correspondingly too sluggish; hence the subjective mind, ever alert for the protection of the body, instantaneously inhibits all brain mentation, seizes upon its mechanism of motion and wields it with inconceivable rapidity and decision, often snatching the body from the very jaws of death. The difference in the action of the two minds in such cases is the difference between reason and instinct.⁸

We thus see that the subjective mind may, and upon occasion does, control every nerve and cell in the physical organism, voluntary and involuntary; but the objective mind cannot control *directly* ONE purely involuntary muscle. This is an extremely important point to consider in anesthesia, which belongs to the vital and involuntary attributes of the human being, who is placed in imminent peril of death when ether or some other powerful drug is administered to him.

There is an intimate relation and nexus between the two systems, but the life forces presided over by the sympathetic nervous system persist independently of the objective mind working through the cerebro-spinal system.⁸ It must be understood that there are not two *separate* nervous systems, but two intimately associated parts of one system.¹²

(To be continued)

PENETOLOGY

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This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

The opening article of a series, such as it is the hope and intention that this Department of THE DENTAL SUMMARY shall contain, is important and rather difficult because of the many avenues by which the complex subject may be approached, and particularly because of the great variety of opinions that have already taken root relative to the subject of the X-ray, Radiology, Roentgenology, etc.

In order to simplify our terminology, all of these and other titles by which the subject has been known in the past will be dropped from our lexicography, and the single word "Penetology" be substituted for all of them.

In order to justify this substitution and clarify our position, let it be said that "Penetology" is a term derived from the word "Penetrate," to which has been added the Greek term "Ology," from "Logos," the expression of a thought or of knowledge. By this combination or coinage, a word is formed which, by combining the meanings of its parts, signifies the knowledge, or learning, and the expression of the knowledge or learning, of, or about, or pertaining to, Penetration.

Applying the term specifically to a practice it is discovered that X-ray photography, in the production of a radiograph or radiogram or roentgenogram, etc., is in reality the application of penetrating rays which produce a reproduction or registration of their force on a sensitive film.

In this Department we shall henceforth limit our discussions to the study of the dental phase of the subject of "Penetology," and all references will be understood as applying to dental films unless otherwise specified.

Why try to introduce a new term to an already well-crowded field? That is a logical question. The answer is simple. There are many terms relating to the subject, and each set of terms has its adherents, so that when one speaks in terms of one writer, the followers of some other writer, who uses a different set of terms, are unable to comprehend, and common understanding fails, much as it did at the building of the Tower of Babel; while to others it has seemed that neither set of terms had any logical derivation.

By the application of the terms, as derived or compounded from a prefix of "peneto," the reference clearly is made to the principal force of X-rays or Roentgen-rays. It is a comparison of their force and property of penetrating masses as in differentiation from ordinary rays of light, which do not penetrate substances to any great depth; at least not sufficiently to be registered.

The dental film which is produced after the exposure of a dental area to the rays from an X-ray tube is a *registration of the penetration of light* which has passed from an X-ray tube through a given area. The variations that can be noted on the film are the result of a variation in penetrating force. That force derives its impulse from the target of an X-ray tube. The rays from an X-ray tube, like rays from the sun, have the power of reducing certain salts of silver. The dental film, like all photographic films, is coated with easily reducible silver salts. In the original packages, these films are wrapped to protect them against exposure to light. The exposure of a dental film package to ordinary light does not cause any reduction of silver salts, while an exposure in the direct or even the indirect line of rays from an X-ray tube causes a reduction on the film, or an "exposure."

From this simple fact alone there can be learned that there is some greater force behind or inherent in the rays of light termed X-rays than there is in solar light.

The discovery of the power of penetration of X-rays was made quite by accident. It did not take long after the discovery of the property of penetration of the X-ray to learn that penetration was not equal or smooth. It also was noted that reduction differed where penetration was made through bone and through soft tissues.

Had William Conrad Roentgen, at the time of his discovery, termed the ray which he discovered of penetrating-ray quality, much confusion as it exists today relative to this subject would have been prevented. However, that is past. We must not presume to rebuke the discoverer of so important a means of modern diagnosis for not having selected a better term or a more comprehensive nomenclature to designate and describe his valuable discovery. His discovery alone is a monument to science. It is a task of the modern profession to adopt and to make use of a common, explanatory and descriptive set of terms.

In the writer's opinion terms derived from "penetration" fill the needs of this branch of the science. The appended list of words and definitions will serve to indicate the possible combinations and will explain their meaning.

Peneto-ray: A phenomenon in physics, the application of which was discovered by William Conrad Roentgen. The most pronounced and useful quality of these rays is their power of penetration.

Penetology: The study and use of the Roentgen-ray as applied to medicine and surgery.

Penetologist: One skilled in Roentgenology, in its application and interpretation.

Penetogram: The shadow-picture produced upon a photographic film by the penetration of an otherwise opaque mass by Roentgen rays. A registration of the penetration of light rays.

Penetography: A verb meaning the making of shadow-pictures by Roentgen-ray penetration. The art of making Roentgenograms.

Penelotherapy: Treatments by the application and penetration of the Roentgen-ray.

Penelodermatitis: Skin reaction, due to too strong or too often-repeated application of the Roentgen-ray. A pathological condition of the skin.

Penetographic Examination: The examination and study of the shadow-pictures produced by the Roentgen-ray upon the photographic film or fluoroscopic screen. The translation of light and shadows into the arrangement of parts as known to exist. In this instance the explanation refers to anatomical arrangement of parts.

Peneto Diagnosis: Diagnosis by aid of the Roentgen-ray. The association of the finding of anatomical changes made visible by the peneto-ray with symptoms of disease; the interpretative branch of Roentgenography; the making of diagnosis from Roentgenograms.

Pathopenetography: The study of pathologic lesions as revealed by the Roentgenogram; it implies and renders imperative a knowledge of the pathology and of the interpretation of normal and abnormal tissue and its position as recorded in the Roentgenogram.

Penetoize: To apply the Roentgen-ray.

Penetoization: The application of the Roentgen-ray.

Penetoism: The untoward effect of the Roentgen-ray.

THE MAKING OF DIAGNOSIS FROM ROENTGENOGRAMS

In subsequent articles in this Department, it will be demonstrated that the diagnosis and understanding or interpretation of the penetogram (exposed X-ray film), when undertaken in terms of penetration, is a most simple procedure, leading to greater and better understanding of the condition as it exists in an area pictured for diagnosis.

This Department will be devoted to assist the profession in the production of better dental penetograms and a better understanding of the conditions they portray.

Questions of interest to the profession in general will be answered through this department.

Questions of personal character or pertaining to specific cases will not be undertaken in this department. All such inquiries should be sent directly to the author at the address given above, and will be given personal and professional attention.

CURRENT COMMENT

In the *Journal National Dental Association*, for October, Dr. C. O. Simpson, of St. Louis, in an article on "The Rational Status of Radiography in Dentistry," brings out many good points. The paper is well worth the time spent in reading it, and shows the seriousness of the thought given to this subject by the leaders in the profession of today. The correction of the practice of the commercial X-ray laboratories and the solution offered do not quite seem to be in accord in this paper. It is first noted that to become proficient many cases of a large variety of types and conditions must be seen to become authority on the subject. The statement is then made that there are many good and well trained technicians. Second, the commercializing of X-ray by the taking of many so-called unnecessary pictures at a minimum fee is condemned and the taking of a lesser number at a respectable professional fee condoned.

Dr. Simpson draws a distinct line between the Interpretation and the Diagnosis of the picture. Why not let this form a dividing line and one side be the laboratory or technical and the other be the professional or diagnostic? The production of a picture of a required area may then be had at a commercial fee, whereas the diagnostic side is to be carried out by the operator, who of necessity must know the case history as well as the clinical findings and who is in a better position to determine what the future treatment is to be. The laboratory technician because of a greater number of exposures of a given area is in a better position to tell if the appearance of the area is the average or if the penetration through such an area approaches the average. To this extent the two divisions could consult. The low fee of a commercial laboratory would permit the operator to exact a fee for his portion of such a consultation commensurate with his fee for the work he is doing for his patient and in ratio to patients' ability to pay. There is no fee-splitting in this.

DENTAL DIZZINESS

A SAN FRANCISCO woman has two diamonds mounted in her teeth. They are set, like windows, in the facades of her incisors, and her smile is literally dazzling. One can imagine the sparkling charm of the gleam of table silver and the crystal of a wineglass reflected in the twin carats. Just the fancy of it must entrance the jewel salesman and the society dentist. Think of the joyful research of the tooth mason and diamond merchant commissioned to find a blue white stone with just enough fire to match the complexion of a pinkish blond. And think of the feminine ecstasies when somebody wears for the first time her dental solitaire.

But the new fad is already threatened. Reports from Germany say that at last real diamonds are being made artificially. Wouldn't it be calamitous if, after acquiring a pair of precious teeth, milady should be asked sweetly if she was carrying a mouthful of synthetic gems from Bavaria. And what would happen to all the women wearing diamond teeth should fashion decree that rubies be worn?

The American Legion Weekly.

EDITORIAL

THE RECENT STATE MEETING IN BRIEF

The attendance at the recent meeting of the Ohio State Dental Society was about twelve hundred.

The papers were interesting and instructive and will be published in early issues of THE SUMMARY.

The clinics were good, the unit clinic of the Miller Club, Cleveland, on Full Denture Technic, attracted special attention. More than twenty clinicians on the program failed to appear.

The Manufacturers' Exhibits were splendid and were visited by everybody.

Legislation requiring annual registration of dentists in the State was endorsed.

Drs. Russell W. Bunting and C. Stanley Smith were reelected on the Callahan Memorial Commission.

The Hancock-Seneca Society is to be redistricted, Seneca County forming a society in itself, Hancock being added to the Northwestern. Also, Butler County Society to be abandoned as a component, Butler County being added to the Cincinnati Society, and Preble County to the Miami Valley Society.

Dr. C. W. Mills presented to the society portraits of all former presidents. An album will be secured and will be kept in the dental library in Columbus.

The National Child Health Council Demonstrations to be given in Mansfield, Ohio were approved with promise of cooperation by the society.

Officers elected were: President, Dr. C. H. Schott, Cincinnati; President-elect, Dr. E. L. Pettibone, Cleveland; Vice-President, Dr. Harry Cope, Columbus; Secretary, Dr. Frank A. Chapman, Columbus; Treasurer, Dr. A. O. Ross, Columbus; Director for three years, Dr. T. J. Way; Delegates to National Dental Association, Drs. C. W. Mills, C. H. Schott, W. A. Price, and Harry Cope; Alternates, Drs. J. K. Douglas, J. J. Welker, E. L. Pettibone, T. J. Way.

The next meeting will be held in Cincinnati at which time the Callahan Memorial will be dedicated.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

Hemorrhage

In obstinate cases of hemorrhage after extraction, after most drugs have failed, try turpentine.—*Gordon C. Barkley, Dental Science Journal of Australia.*

Rubber Bowls

If the upper part of rubber bulb of your chip blower wears out, cut the lower half off, which makes an ideal plaster bowl for small work, such as inlays and small bridges.—*H. E. Bliler, Dental Facts.*

Guarantees

Bruce Walker, the colored custodian at the Kansas City Western Dental College, made a rather neat reply to a question a patient asked him the other day. It seems the patient was a prospect for a full upper and lower plate, and in the course of his conversation with Bruce, he asked him if the College guaranteed its work. Bruce said: "Shucks, man, God Almighty didn't guarantee the teeth He gave you. How can you expect poor humans like us to?"

—*Hettinger's Dental News.*

Removing Blood Stains

The walls of a cavity are apt to become stained with blood during the process of pulp removal and cavity preparation. Hydrogen peroxid is not nearly so quick to clean this off as is normal salt solution, once applied, on cotton-wool.—*W. Stewart Ziele, Dental Science Journal of Australia.*

Treatment After Extraction

After extracting a tooth, whether by nerve-blocking, infiltration, or local injection, be sure to clear away fractured bone from the socket. Press outside the mucous membrane with thumb and index-finger; wash the socket out with saline solution and swab with an applicator saturated with iodine; then instruct the patient to apply cold applications to the outside of the face for about twenty minutes.—*S. C. Dental Record.*

Waxing Instruments

Wax your instruments when conveying cement or pro-tem to the cavities. It lets go of the instrument easier.—*Herbert B. Ward, Hettinger's Dental News.*

A Good Silex Investment

A good smooth investment material for inlay work and the coating of any wax pattern may be made as follows:

Take three pounds of the best powdered silex you can obtain, one pound of Kerr's white model plaster and four ounces of Venetian Red, mix them thoroughly by sifting through a flour sifter. When the color has become uniform, the mix will be satisfactory. *F. W. F. Pacific Dental Gazette.*

To Replace a Facing

Use calipers to get the exact size of the facing in mm. Select a facing the proper shade and cut the pins off with a separating disk. Cut two vertical grooves on the back of the facing and slightly dovetail to slip over pinheads in the bridge. You can tell when the grooves are deep enough when the pins have disappeared in the grinding, using the separating disk. As this method requires no drilling in the solder the lingual surface of the bridge is left smooth to the tongue. If carefully done the repair cannot be detected.—*Dental Cosmos.*

Coating of Plaster Casts

Rx. Sulphuric ether.....	oz. IV
Collodium.....	oz. II
Silver glass.....	oz. II

Mix sig: Use as a coating to plaster casts. The silver glass may be obtained from dealers in painters' supplies. Keep the solution well corked and allow it to stand forty-eight hours before using and apply with camel's hair brush, giving your model a nice white, glossy surface.—*R. L. Lewis, Dental Facts.*

Miscellaneous

Among the important practical results of recent scientific research in alloy technic are the recommendations which contradict the former supposition that alloy and mercury should be weighed, or measured, in exact proportion for mixing. Technic for a number of good alloys specifies plenty of mercury—enough to make a thoroughly smooth, plastic mix, between the two extremes of dryness and "sloppiness;" that any procedure which more intimately units the alloy with the mercury, wetting each particle, makes better amalgam; that hard packing gives the amalgam greater strength; that elimination of surface oxids and sulfids (during manufacture) greatly improves amalgamating properties, color and integrity of the filling; that setting is controlled by the operator; that squeezing out mercury hastens setting; that leaving in the mass (until inserted) retards setting.

The importance of the sterilization of instruments cannot be overestimated and an agent should be used having a known germicidal efficiency.—*W. W. Crate, Dental Cosmos.*

SOCIETY ANNOUNCEMENTS

Tennessee State

The next Tennessee State Dental meeting will be held on May 8, 9, 10, 11, 1922, in Memphis, Tennessee.

Arkansas State Board

The Arkansas Board of Dental Examiners will hold a special examination at Hotel Marion, Little Rock, Arkansas, January 23, 24, 25. Address all communications to Dr. H. J. Crume, Secy., Eldorado, Ark.

H. J. GREEN, *President*.

Kentucky State

The next Annual Meeting of the Kentucky State Dental Association will be held in Louisville, Kentucky, April 10, 11, 12, 1922, Seelbach Hotel as headquarters. A Clinical Program of unusual interest is being arranged. Address all correspondence to W. M. Randall, Secretary, Louisville, Ky.

W. W. RANDALL, *Secretary*, Louisville, Ky.

Pennsylvania State

The fifty-fourth annual meeting of the Pennsylvania State Dental Society will be held in Syria Mosque, Pittsburgh, April 11, 12 and 13, 1922. An interesting and instructive program has been arranged. Members holding National Dental Association cards from other states, are cordially invited to attend all sessions.

W. L. FICKES, *Secretary*,
East End Trust Bldg., Pittsburgh, Pa.

Alumni Society of the Dewey School of Orthodontia

The next annual meeting of this society will be held on April 27, 28 at the Edgewater Beach Hotel, Chicago. The usual high standard of the meetings of the society will be maintained. All interested in orthodontia are cordially invited to attend these meetings.

GEORGE F. BURKE, *Secretary*,
741-43 David Whitney Bldg., Detroit, Mich.

Annual Convention Texas State Dental Society

The Texas State Dental Society will hold its 42nd Annual Convention March 13 and 14, 1922 at Houston, Texas.

The special features of the program will be lectures and clinic work by Dr. Boyd S. Gardner, of Rochester, Minn. and Dr. Carl Hoffer, of Nashville, Tenn., with symposiums and unit clinics by members of the Society.

During the four days following, a post-graduate class course will be conducted by Drs. Willis Al Coston, Topeka, Kan.; Russell W. Tench, New York City; Arthur E. Smith, Chicago; T. W. Maves, Minneapolis and Julian Smith, Dallas.

J. G. FIFE, *Secretary*, 1813 Main St., Dallas, Tex.

New York Society of Orthodontists

The next regular meeting of the New York Society of Orthodontists will be held during the afternoon and evening of Wednesday, February 8th, 1922 at the Hotel Vanderbilt, Park Avenue and 34th Street, New York City.

A scientific program including clinics and case reports begins promptly at four o'clock. Dinner will be served at about six-thirty o'clock and the scientific program continued at the conclusion of the dinner.

Ethical members of the profession, interested in the science of Orthodontia are cordially invited to be present.

WILLIAM C. FISHER, *Secretary-Treasurer*
501 Fifth Avenue, New York City.

J. LOWE YOUNG, *President*
18 West 74th Street, New York City.

National Dental Convention

The twenty-sixth annual convention of the National Dental Association, will be held in Los Angeles, California, July 17th to 21st, 1922.

The Ambassador, one of the city's newest and largest hotels, situated in the heart of one of the most beautiful residential districts, will be convention headquarters and practically all sessions can be held in the hotel or on the grounds.

The Local Committee on Arrangements can safely state that this meeting will provide an excellent program, demonstrating that "Dentistry can add ten years to the average of human life." This committee can also safely state that our visitors will be well entertained during their sojourn in Los Angeles.

It is none too early to plan a vacation, westward, in July 1922 and to send for hotel reservations.

Watch for further and detailed announcements in all Dental Journals.

The Local Committee on Arrangements, per
C. M. BENBROOK, *General Chairman*,
707 Auditorium Bldg., Los Angeles, California.

TRI-STATE MEETING

Missouri, Kansas and Oklahoma State Dental Societies

The Missouri, Kansas and Oklahoma State Dental Societies will hold a joint meeting in Kansas City, Mo., April 10-15, 1922. This event promises to be one of the big and important dental meetings of the year. It will be a big meeting because this will be the annual meeting of each of the three state societies. It will be an important meeting because of the subjects on the program and the manner in which they are to be presented.

The "teaching system" will be used almost exclusively. It is not the intention to present many new things but to have a more thorough and better presentation of many of the older things.

The forenoons of four days will be set aside for lectures to the full attendance by the following well-known men of the profession:

Dr. Arthur D. Black.....	Chicago
Dr. Howard R. Raper.....	Indianapolis
Dr. C. N. Johnson.....	Chicago
Dr. Wallace Seccombe.....	Toronto
Dr. Arthur E. Smith.....	Chicago
Dr. M. M. House.....	Indianapolis
Dr. Frederick B. Noyes.....	Chicago
Dr. Marcus L. Ward.....	Ann Arbor

The afternoon of these same days will be devoted to sectional work. The full attendance will be divided into classes and each class will receive an orderly and detailed presentation of the subject under consideration in that section.

SECTIONAL DIRECTORS

Radiodontia.....	Clarence O. Simpson, St. Louis
Full Dentures.....	Dayton D. Campbell, Kansas City
Anchor Dentures.....	Charles Arthur Furrow, Tulsa
Root Canal Technic.....	W. A. Chamberlain, St. Louis
Pyorrhea and Prophylaxis.....	J. M. Temples, Tulsa
Casting Technic.....	E. H. Hart, St. Louis
Office Efficiency and Assistants.....	C. A. Martin, Winfield
Orthodontia.....	Hugh Tanzey, Kansas City
Dietetics in its Relation to Preventive Dentistry.....	A. L. Walters, Tulsa
Crown and Bridge Work.....	W. A. Coston, Topeka
Block Anesthesia.....	F. C. Reisling, Tulsa
Dental Ceramics.....	J. E. Huff, Kansas City

There will be one day of general clinics by members of the three state societies.

Owing to the fact that the amount of dues collected by most dental societies, are just about enough to pay for "janitor services," it will be necessary to collect a very small fee from each person attending this meeting. Members of other state dental societies are most cordially invited to attend this meeting on the same conditions as our own members, viz: you must be a member of your state society with your 1922 dues paid in full. Each person must present his 1922 membership card for registration. These rules will be rigidly enforced. The dental society is the greatest educational factor in our profession, hence the benefits to be derived from attendance at a meeting of the magnitude

this one promises to be, should make a strong appeal to the members of the profession of this section of the country.

The Tri-State Dental Bulletin will be mailed to any one interested in the details of the meeting, upon request to the secretary.

E. M. HALL, *Chairman*,

Kansas City, Mo.

C. R. LAWRENCE, *Secretary Treasurer*,

Enid, Oklahoma.

Of the Organization Committee.

National Health Exposition at Louisville

The National Health Exposition, occupying 60,000 square feet of floor space, will be held in the Jefferson County Armory at Louisville, February 1-9, 1922. This is under the auspices of the United States Public Health Service, State Board of Health of Kentucky, Jefferson county Board of Health and the Health Department of the City of Louisville. It will include exhibits in hospitalization, nursing, dentistry, medicine and pharmacy. The University of Louisville, the public school system, and various local, state and national health organizations will participate.

The annual conference of the city and county health officers, the annual convention of the Kentucky State Public Health Association and other health meetings are already scheduled in connection with the Exposition.

An institute will be conducted by the United States Public Health Service and its program will include:

Dr. M. J. Rosenau, Dean of the Harvard School of Public Health; Dr. Josephine Baker, Director of the Department of Child Hygiene, New York City Board of Health; Dr. Wm. A. Evans, former Health Officer of Chicago and the most distinguished public health editor in America; George T. Palmer, President of the Illinois Tuberculosis Association and Director of the Bureau of Tuberculosis of the Illinois State Board of Health; Dr. Frederick E. Greene, Secretary of the Council on Health and Public Instruction, American Medical Association; Dr. Valeria H. Parker, Director of the Interdepartmental Board of Social Hygiene; Dr. John H. Stokes, distinguished syphilographer of the Mayo Clinic; Dr. Frankwood Williams, Director of the National Association of Mental Hygiene; Dr. W. S. Rankin, State Health Officer of North Carolina, a member of the Council of Health and Public Instruction of the American Medical Association, and recently President of the American Public Health Association; Dr. John Dill Robertson, Health Officer of Chicago; Dr. John R. McDowell, Director of Health for the Lake Division, American Red Cross; Dr. John R. McMullen, United States Public Health Service, and Miss Frances Brink, Director of the National Organization for Public Health Nursing.

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THESE alloys are suitable for cast inlays and other individual tooth restorations where the stress is not great. They consist of pure gold and a small percentage of alloying elements.

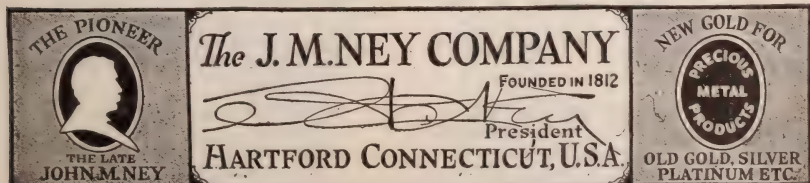
Ney-Oro "A" contains sufficient alloy to modify the behavior of pure gold in casting but not to cause any perceptible change in color or melting point. The hardness is slightly increased.

Ney-Oro "D" is so alloyed as to be less conspicuous in the mouth than pure gold or the ordinary alloyed golds of more glaring color. It is somewhat harder than "A."

The other alloys of the Ney-Oro Series serve their special purposes in Prosthodontia and Orthodontia equally as well as "A" and "D" serve in the making of cast inlays.

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DIRECTORY OF STATE SOCIETIES FOR 1921-1922

(Will society officials kindly send additional dates and corrections?)

Alabama—Birmingham, April 11, 12, 13, 1922.

President: F. F. Perry, Montgomery.

Treasurer: Geo. C. Bledsoe, Cullman.

Secretary: S. B. Hopkins, Greenville.

Alaska—

President: E. F. Germain, Anchorage.

Secretary and Treasurer: L. S. Keller, Skagway.

Arizona: Phoenix, November 10, 1921.

President: W. D. Shackelford, W. Adams, St., Phoenix.

Secretary and Treasurer: J. C. Roberts, 44 N. 1st Ave., Phoenix.

Arkansas—Little Rock, May, 1922.

President: C. U. Mayfield, Pine Bluff.

Secretary and Treasurer: W. F. Williams, Urquhart Bldg., Little Rock.

Southern California—Los Angeles, June, 1922.

President: R. C. Lane, Story Bldg., Los Angeles.

Treasurer: C. C. Noble, Wright-Collander Bldg., Los Angeles.

Secretary: Bert Boyd, 1010 Story Bldg., Los Angeles.

California State—

President: J. Camp Dean, Dalziel Bldg., Oakland.

Treasurer: Robert E. Keys, 391 Sutter St., San Francisco.

Secretary: B. Frank Gray, 909 Hyde St., San Francisco.

Colorado—June, 1922.

President: W. A. DeBerry, National Bank, Colorado Springs.

Treasurer: William Smedley, Sr., 604 California Bldg., Denver.

Secretary: H. W. Wilson 604 Metropolitan Bldg., Denver

Connecticut—New Haven, April 20, 21, 22.

President: Morton J. Loeb, 241 Orange, New Haven.

Treasurer: Ralph H. Keeler, Manwaring Bldg., New Haven.

Secretary: Clesson Gibbs, 886 Main St., Bridgeport.

Delaware—Wilmington, Sept. 14, 1922.

President: W. E. Harris, 211 W. 10th St. Wilmington.

Treasurer: P. A. Traynor, 807 Washington St., Wilmington.

Secretary: E. F. Cullen, 200 Ford Bldg., Wilmington.

District of Columbia—Washington, D. C., October.

President: Carl J. Mess, Braddock Heights, Alexandria, Va.

Treasurer: M. F. Finley, 1928 I St., N., Washington, D. C.

Secretary: W. M. Simkins, 720 Woodward Bldg., Washington, D. C.

Florida—

President: G. B. Tison, Gainesville, Fla.

Secretary and Treasurer: H. B. Pattishall, 332 St. James Bldg., Jacksonville.

Georgia—Augusta, June 14, 15, 16, 1922.

President: A. P. Gordy, Masonic Temple, Columbus.

Treasurer: S. R. Atkinson, Jr., Candler Bldg., Atlanta.

Secretary: J. R. Mitchell, Candler Bldg. Atlanta.

Hawaiian Islands—Honolulu, December 2.

President: J. M. Whitney, Boston Bldg., Honolulu.

Treasurer: C. B. High, Young Bldg., Honolulu.

Secretary: J. H. Waddell, Boston Bldg., Honolulu.

Idaho—Pocatello.

President: B. H. Hudson, Blackfoot.

Treasurer: Wm. Ludden, St. Anthony.

Secretary: M. J. Goode, Filer.

Illinois—Springfield, May 9, 10, 11, 1922.

President: F. B. Noyes, Peoples Gas Bldg., Chicago.

Treasurer: T. L. Grisamore, 29 E. Madison St., Chicago.

Secretary: Arthur G. Smith, 511 Central Nat. Bldg., Peoria.

Indiana—Indianapolis, May 15, 16, 17, 18.

President: C. R. Jackson, 907 Hume Mansur Bldg. Indianapolis.

Treasurer: C. C. Priest, Marion

Secretary: A. J. Kimm, 704-5 Citizens Bank Bldg., Evansville.

Iowa—Des Moines, May 2, 3, 4, 1922.

President: Clarence V. Watts, 315 K. P. Block, Des Moines.

Treasurer: Frank Fourt, Fairfield.

Secretary: Earle C. Smith, 635 So. Governor St., Iowa City.

Kansas—Kansas City, March, 1922.

President: J. F. Keman, Sweetser Bldg., Wichita.

Treasurer: E. C. Glass, Independence.

Secretary: C. K. Weaver, Clay Center.

Kentucky—Louisville, April 10, 11, 12, 1922.

President: E. B. Hardin, Madisonville.

Treasurer: R. L. Spratt, Mt. Sterling.

Secretary: W. M. Randall, 1035 2nd St., Louisville.

Louisiana—Shreveport, May or June.

President: L. Dempsey, 943 Jackson Ave., New Orleans.

Treasurer: O. J. Ory, Garyville.

Secretary: Fred Ratzburg, Shreveport.

Maine—

President: Edward A. Sheehy, Rumford.

Secretary: B. C. Graffam, 655 Congress St., Portland.

Treasurer: I. E. Pendleton, Pine St., Lewiston.

Maryland—Baltimore.

President: B. L. Brum, 827 Park Ave., Baltimore.

Treasurer: H. A. Wilson, Calvert Bank Bldg., Baltimore.

Secretary: J. H. Ferguson, Jr., 914 N. Charles St., Baltimore.

Massachusetts—Worcester, May 3, 4, 5, 1922.

President: Frank P. Barnard, 507 Main St., Worcester.

Treasurer: J. T. Paul, 419 Boylston St., Boston.

Secretary: W. Vernon Ryder, 175 Newbury St., Boston.

Michigan—Detroit, April.

President: R. W. Bunting, Ann Arbor.

Treasurer: E. J. Chamberlain, 519 Ashton Bldg., Grand Rapids.

Secretary: Wm. A. Cook, 1853 David Whitney Bldg., Detroit.

Minnesota—Minneapolis, February, 1922.

President: Max E. Ernst, Lawry Bldg., St. Paul.

Treasurer: T. D. Abernathy, Dental Bldg., Rochester.

Secretary: C. H. Turnquist, 338 LaSalle Bldg., Minneapolis.

Mississippi—Meridian, April.

President: J. E. Hargis, Oxford.

Treasurer: C. K. Bailey, Grenada.

Secretary: W. F. Beavers, Meridian.

Missouri—Kansas City, April, 1922.

President: Edw. M. Hall, Shuckert Bldg., Kansas City.

Treasurer: J. F. McLellan, Moberly.

Secretary: H. C. Pollock, 723 Metropolitan Bldg., St. Louis.

Montana—Helena.

President: C. H. Head, Helena.

Secretary and Treasurer: J. E. Baker, Great Falls.

National Capital—George Washington University, October.

President: John E. Black, 825 Vermont Ave., Washington, D. C.

Treasurer: F. I. Bartlett, 1225 New York Ave., Washington, D. C.

Secretary: C. Willard Camalier, 921 15th St., N. W., Washington, D. C.

Nebraska—Lincoln, May, 1922.

President: H. E. King, 546 Peters Trust Bldg., Omaha.

Treasurer: E. W. Fellers, Beatrice.

Secretary: G. H. Grubb, Ganter Blk., Lincoln.

New Hampshire—

President: B. H. Goodwin, Enfield.

Treasurer: Wm. A. Young, 40 N. Main St., Concord.

Secretary: L. I. Moulton, 15 N. Main St., Concord.

New Jersey—

President: W. W. Hodges, Raritan Bldg., Perth Amboy.

Treasurer: Chas. Faupel, 484 Bergen Ave., Jersey City.

Secretary: F. K. Heazelton, 223 E. Hanover St., Trenton.

New Mexico—Albuquerque.

President: C. H. Woolgar, Magdalena.

Secretary and Treasurer: D. P. Nolting, Albuquerque.

New York—

President: B. S. Hert, C. of C. Bldg., Rochester.

Secretary: A. P. Burkhart, 52 Genesee St., Auburn.

Treasurer: G. H. Butler, University Bldg., Syracuse.

North Carolina—Wrightsville Beach, June.

President: W. M. Robey, Charlotte.

Treasurer: R. M. Morrow, Burlington.

Secretary: H. O. Lineberger, Raleigh.

North Dakota—Fargo, May, 1922.

President: T. E. Barber, Grand Forks.

Treasurer: J. H. Wells, Harvey.

Secretary: Solon Crum, Fargo.

Oklahoma—

President: A. B. Walker, Fairview.

Secretary: Frank C. Reisling, 606 New Wright Bldg., Tulsa.

Treasurer: T. W. Sorrels, Colcord Bldg., Oklahoma City.

Oregon—

President: Clyde Mount, Oregon City.

Treasurer: F. E. Gulick, Morgan Bldg., Portland.

Secretary: W. C. Shearer, 412 Stevens Bldg., Portland.

Pennsylvania—

President: John F. Biddle, 517 Arch St., Pittsburgh.

Secretary: W. L. Fickes, 6004 Penn. Ave., Pittsburgh.

Treasurer: A. B. Miller, 299 Wyoming Ave., Kingston.

Rhode Island—Providence, October.

President: Wm. R. Burke, 171 Westminster St., Providence.

Treasurer: Howard W. Church, Bristol.

Secretary: Ambrose H. Lynch, 511 Westminster St., Providence.

South Carolina—Georgetown, May, 1922.

President: W. C. Milhous, Barnwell.

Treasurer: A. H. Corley, Edgefield.

Secretary: E. C. Dye, Greenville.

South Dakota—Sioux Falls, March, 1922.

President: R. H. Fouser, Salem.

Treasurer: Ferdinand Brown, Sioux Falls.

Secretary: Ernest W. Elmen, Sioux Falls.

Tennessee—Memphis, May 8, 9, 10, 11, 1922.

President: G. L. Powers, Memphis.

Secretary and Treasurer: J. Minor, Doctors Bldg., Nashville.

Texas—Houston.

President: W. D. McCarty, Moore Bldg., San Antonio.

Secretary and Treasurer: J. G. Fife, 736 Wilson Bldg., Dallas.

Utah—Salt Lake City, June 19-24, 1922.

President: R. L. Watson, Judge Bldg., Salt Lake City.

Secretary and Treasurer: E. W. Browning, Ogden.

Vermont—Rutland, March 15, 16, 17, 1922.

President: G. M. Somers, Proctor.

Treasurer: Thomas Mound, Rutland.

Secretary: Carter R. Woods, Rutland.

Virginia—Richmond, October.

President: M. B. Rudd, Chamber of Commerce Bldg., Richmond.

Treasurer: W. N. Hodgkin, Warenton.

Secretary: Harry Bear, 410 Professional Bldg., Richmond

Washington—Seattle, July, 1922

President: L. B. Manchester, Wanatchee.

Secretary and Treasurer: W B Power, Cobb Bldg., Seattle

West Virginia—Fairmont, April 10, 11, 12, 1922

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Wisconsin—Milwaukee, July 11, 12, 13, 1922.

President: E. C. Oviatt, Columbus.

Treasurer: A. Gropper, 616 Goldsmith Bldg Milwaukee.

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Wyoming—Sheridan, June 20, 21, 22, 1922.

President: I. P. Hayes, Sheridan.

Treasurer: Peter Appel, Jr., Cheyenne.

Secretary: E. C. Andrew, Cheyenne.



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Treasurer

The third regular meeting was held at Commerce Club, with an attendance of 35—which was big considering that the meeting followed so closely upon the heels of the State meeting.

The program was given as announced by the Preventive Section of the Toledo Dental Study Club, Drs. Sherwood, Vollmayer, McUmber, and W. S. Sargeant. A talk by the Chairman, Dr. Sherwood, and clinics by members touching upon the care of patients' mouths from a preventive standpoint, were given; also suggested talks to patients regarding the toothbrush and its use. Powders, pastes and floss were discussed by clinicians.

Ten members reported parts of the State meeting. Report was discussed by others.

Dr. C. Eichman was elected to membership.

The bowling contest at 4:30 resulted in George Dierks making high score, 235. Better break away early next month and get rid of a little of that adipose tissue.

Another dandy dinner was served—most of the fellows said: "the best ever." If we keep up the attendance our caterers will take interest in us, and give us the best to be had.

Dr. O. O. Leininger was presented the silver medal, as winner of the second flight golf contest, by Dr. L. L. Barber, "runner-up," who made the hit of the evening in his presentation speech. A little bird told us that the contest was not decided until the last shot at the last hole.

Now, fellows, the season has but fairly begun. Let's get down to real brass tacks and make things hum from now on, beginning with January. Did any of you see the clinics put on at Columbus by the Miller Study Club of Cleveland? They covered the entire subject of denture prosthesis from impression taking to delivery of finished work—except collection of the fee! Suppose they thought everybody knew all about that—also, what to do with the money after collection! It is the intention to print descriptions of these clinics later on. The point is that we have just as good men right here in our own little group. Why not begin now to get ready for next State meeting? We can do it.

CORRESPONDENCE

Hammond, Ind., Dec. 8, 1921.

EDITOR THE DENTAL SUMMARY:

Dear Sir: At one of the recent sessions of the National Society of Denture Prosthetists, the following resolution was passed:*

Recently we have heard reports that the N. S. D. P. has placed its official O. K. on certain work done by individuals, thus making such standard in the opinion of the Society.

We would brand any such statements from whatever source as being uninformed, erroneous, and misleading, to say the least.

The National Society of Denture Prosthetists was organized for serious research work in a given line. During the few meetings that have thus far been held, we have learned that much of our study takes us back into the foundation work of all dentistry; hence we cannot rush to conclusions before we ourselves are in possession of more fundamental facts.

Each year has added to our store of knowledge and we are encouraged to believe that the near future will find us able to offer the profession something of a standardized denture technic which can be accepted unreservedly.

Until that time arrives, we would like to have the members of our profession understand that any talk about "official stamp of approval" having been placed upon any work or technic or device is not true.

We would thank you to give this information to the profession through your valuable journal.

This letter is written by authority of the Secretary and Chairman of the Executive Council of the N. S. D. P., Dr. E. B. Owen, of St. Louis and Dr. M. M. House, of Indianapolis, respectively.

Yours truly,

ROBT. GILLIS.

"*This Society has *not* adopted as final the reports of the various committees, and that***** members of the Society when making statements concerning technic, classification, etc., do so as individuals and not with the authority of the Society."

Minnesota State Dental Association

The thirty-ninth annual meeting of the Minnesota State Dental Association will be held at the Minneapolis Armory on February 22nd to 25th, 1922.

LEGAL DEPARTMENT

CONDUCTED BY ELTON J. BUCKLEY, 643 LAND TITLE BUILDING, PHILADELPHIA, PA.

If You Get Any Indorsed Checks Read This:

One of my clients has just sustained a misfortune which may point a moral to some reader hereof. Certainly the situation presented is liable to occur to almost anybody, and it may be useful to know what to do and what not to do if it does occur.

My client sold some merchandise to A. A. was not in too good financial repute and when he proposed to pay for the merchandise with a check (it was a cash purchase) the seller insisted on having an indorser. Whereupon the check was made to and indorsed by the buyer's father, whose financial responsibility was undoubted.

This was on September 24th. The check was drawn on a Philadelphia bank and my client, feeling perfectly safe with the check, bearing the father's indorsement, delayed in depositing it until September 30th. The fact was his bookkeeper was ill and he had to do the bank running himself. He is kept pretty busy in his office and instead of making daily deposits, as his bookkeeper did when there, he saved up until he had a larger deposit every few days.

When he presented the check on September 30th, the receiving teller told him that the maker of it had meanwhile failed. "Well, I was lucky to get a good indorsement on it, wasn't I?" he said in great glee. But when he made demand on the father for payment, as indorser, he received a reply from the father's lawyer, taking the position that the delay in presenting the check had absolved the indorser, leaving my client to whatever he could get out of the bankrupt estate of the maker of the check.

At this stage the client brought the matter to me. In endeavoring to find some hope for him in the law books, I accumulated some good law for the readers of these articles, but no hope at all for the client. It is indeed the law that delay in the presentation of a check indorsed by a third party releases the indorser if the maker of the check goes broke meanwhile, even though the indorser has sustained no loss by the delay.

The law is nowhere more strict than in the matter of presenting an indorsed check for payment. If you are in the same town as the bank where the check is drawn, the thing is easy—you should present it not later than the next day, and it is even better to deposit it in your own bank the same day. Of course, it is not necessary to go in person with the check to the bank where it was drawn; you follow the usual course and deposit it in your own bank, and the bank does the rest. If it doesn't do it promptly it is liable to you if anything happens.

If you are in another town than the one where the check is payable, the check should be forwarded by mail on the day it was re-

ceived, if that is at all convenient or practicable. If not, then on the day after, and it must be actually presented to the bank on which it is drawn at the latest on the day after it gets to the town where payable.

The only safe course with any indorsed check, if the indorsement is valuable, is to deposit it in your own bank on the same day it is received.

In one of the cases which I turned up, and which I found was regarded as a leading case, a check was given by A to B in payment of a debt A owed to B, then indorsed by B over to C in payment of a debt B owed to C. The check was promptly deposited by C, and presented by C's bank to A's bank for payment. It was not properly drawn, however, and was returned, though A had sufficient funds on deposit then to pay it. Delay ensued in returning it, and by the time it got back A had failed. C then sued B, the indorser, but B defended on the ground that the delay in presentation let him out. The court said it did. Read this from the decision:—

Applying the rule to the facts of this case, we find that there was a daily mail running from plaintiff's place of residence to Ravenswood, the place of payment of the check, leaving plaintiff's (holder of the check) place of residence between 1 and 2 o'clock in the afternoon, and arriving at Ravenswood (where the check was payable) about an hour later. This being so, it was his duty to forward this check to Ravenswood for presentation to the bank on which it was drawn not later than the mail leaving his post office on the afternoon of Monday the 2d day of December (the check was dated November 30th.) It further appears that this train would have reached Ravenswood between 2 and 3 o'clock, so it may be said that it could not have been conveniently presented for payment on that date, but it was the plaintiff's duty to have it presented during business hours on the next day. His failure to have it presented for payment to the bank on which it was drawn, and demand payment thereof, within the time above indicated, was a failure on his part to exercise due diligence in the collection of said check. He did not present it within a reasonable time.

It is always good business to deposit any check the same day as received, whether it bears an indorsement or not, but it is particularly necessary to deposit an indorsed check the same day. Where delay occurs, the maker of the check is never released unless he has suffered damage by the delay, but the indorser is released whether he has suffered damage or not.

(Copyright, December, 1921, by Elton J. Buckley,
643 Land Title Bldg., Philadelphia, Pa.)

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

Here we are again, starting a new year, with every assurance of a good year, if not the very best THE SUMMARY ever had, ahead of us. Have you read the prospectus, published in December? What do you think of it? Now turn over and read the two new departments—Department of Penetology and Legal Department. I should personally like to know your opinion of both of them. Do not forget that full discussion and criticism are invited. And particularly do not forget that you are very welcome to write to both Dr. Lurie and Mr. Buckley, direct and ask either of them any questions that you may want answered, either through the magazine or direct. Mr. Buckley is an able lawyer and legal writer, who is very willing to do all he can to unravel your legal tangles if you have any. Many of you know Dr. Lurie.

THE DENTAL SUMMARY now offers you a four-fold direct service:

Professional—through the Service Department.

X-ray Work—through its Penetology editor.

Legal—through the conductor of that department.

Business—through the writer, aided by the entire business organization of its publishers.

Every reader of THE SUMMARY is entitled to anything that any of us can give him that will be of assistance in any way.

Begin the New Year right by determining that you have served your full time as Mr. E. Z. Mark, and to look after your dollars after you have earned them a little more carefully than ever before in your life.

Don't accept or cash checks from strangers.

Don't buy Liberty Bonds or any other security except through regular channels.

Don't buy mine stock, oil-well stock, rubber-grove stock, orange-grove stock, Florida real-estate, marl beds, or any other stocks or bonds that you do not know all about or can learn all about through your banker.

If you have money to invest, put it into something that you know is stable, dependable and reputable.

It is pretty evident that our new Department of Penetology, under the management of William A. Lurie, M. D., New Orleans, La., is going to be popular, as witness the following extracts from two letters received by Dr. Lurie:

"Allow me to congratulate THE DENTAL SUMMARY on getting you on its staff to handle

the subject of Penetology. That is great, and I predict a very useful career for you there. It will be a fine opportunity for your former pupils to keep in touch with you, and to get new ideas from you and from others. I have sent in my subscription solely because of your connection with the magazine. My very best wishes for your success, and I think the dental profession is fortunate and THE DENTAL SUMMARY far-sighted"—L. D. J., San Diego, Cal.

"Please enter subscription through my dealer. I want everything you write."—R. O. B., Charlestown, W. Va.

Needless to say that these letters are pleasing to us. In selecting an editor for our new department it was considered best to go outside the dental profession if necessary to find a man who had made a really exhaustive study of the subject, in order to avoid, so far as possible, the effect of any little jealousies that might interfere with the greatest good to the greatest number. Dr. Lurie is such a man, as readers will be convinced after reading his brief opening chapter in this issue. Readers of THE SUMMARY who will follow him through the series for 1922 will be convinced that we have made a wise selection.

During the month of October there were twelve suits filed against dentists for alleged malpractice that are being defended by a protective association. Do not know how many are being fought out by the dentists without such aid. Among the causes for suit are:

General dissatisfaction with dental work done.

Died in chair under anesthesia.

General allegation of damages during treatment of pyorrhea.

Broke jaw and left root in situ.

Fracture during removal of impacted molar.

Tongue cut during preparation for crown.

Patient lunched and dentist cut chin. Wants \$20,000.00.

Facial disfigurement following extraction of molar.

"Pain and anguish" from ill-fitting bridge.

Lock-jaw resulting from use of septic instruments.

Infection requiring operation following preparation of cavities.

Look 'em over. Of course, you may never, never lay yourself liable to such suits—that is, you may not practice at all! But the chances are that you do, and the moral obviously is that you cannot be too careful in your work, and you cannot know your patients too well.



Look *for the* Crescent

—The mark we place on Trubyte
Teeth for your protection.



Thousands of years ago a brick maker in Babylon placed a mark or *character* on each brick which he made. He was proud of those bricks and builders of that day who would build well looked for his mark on the bricks they bought. Other bricks were just bricks. His were

dignified by a *character*. Today every conscientious manufacturer places on his product a mark of identification, a guarantee of quality and evidence of pride in his work. While there is nothing to prevent imitators counterfeiting his goods they dare not imitate his trade mark.

Trubyte

—the Teeth we are Proud to Mark

The manufacturers of Trubyte Teeth are glad their product is so good that it is worthy of imitation, but there are reasons why we want the dentists of the world to know *genuine Trubyte Teeth* when they see them. So we ask you to “look for the crescent” on the lingual surface of Trubyte anterior teeth. It is your guarantee of genuineness and all that research and skilled workmanship can put into a product.

If there is any question about the teeth you are getting, “look for the crescent.”

All reputable dealers carry stocks of Trubyte Teeth. Reputable dental laboratories are glad to use them. They are quick to see that Trubyte Teeth permit them to make dentures which display their workmanship to the best advantage, while their naturalness appeals to your patient and gives character to every denture.

Satisfy yourself that you have genuine Trubyte Teeth and we will be responsible for the result.

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The DENTISTS' SUPPLY COMPANY

220 West 42nd Street

New York City

The Grading of Patients

EDITOR NEWS AND OPINIONS:

Dear Sir: Please send particulars about "grading your patients" as per your little notice in November SUMMARY and oblige.

—A. L. S.

In response to several letters of same tenor as above, I submit the following for consideration and discussion:

My idea of grading patients rests upon the broad consideration that all the wealth in any community belongs to that community as a whole; as we say: "The wealth of the State," the "Wealth of America," etc. Of course, every community is made up of units, each person in the community being one of those units, and the "community wealth" is merely the total wealth of all of the units. On this basis, the man of much wealth is worth more to the community than the one who has little or none.

On the other hand, services rendered to any unit, any person, is rendered to the community as a whole. If you or anybody else renders a service that improves the health or well-being of a unit in a community, the health and well-being of the community as a whole is improved, and he who renders the service is entitled to a tangible reward in proportion to the value of the service rendered.

As such services rendered to a man of wealth are worth more in a financial sense to the community than similar services rendered to one who contributes but little to the community wealth, they are entitled to a correspondingly larger reward. Of course, as the unit, the person, represents the city, the community, he must pay out of his share of the general wealth.

The case is equally strong if we consider the individual only. The only thing anybody has is time. The time of a man earning \$10 per day is worth ten times as much as that of the man who earns only one dollar per day. Earning time is measured by two things—life and health. A man seldom earns very much after he is dead, and he doesn't do much better while he is alive if in poor health. A dentist who renders real service prolongs life and improves health, thereby lengthening the earning period, and improving the earning capacity during the entire period of life.

Viewed from either standpoint, the community or the individual, the dentist is entitled to greater reward for equal service rendered to different individuals, depending upon the financial value of the individual to the community or to himself.

Courts of law recognize this principle, and give verdicts accordingly. A service that is worth only \$10 to the poor man of small income, may easily be worth \$100 to the wealthy man of large income.

Then there is the question of "charity work." Every professional man is bound by his professional obligation to render such service

whenever it may be called for to the limit of his ability. This is an obligation that cannot be side-stepped. However, every atom of such charity work is service rendered to the community and to every unit in it. And the community, through the individuals who make it up, should pay a proper proportionate reward to him who renders it. As society is at present constituted, the only way in which compensation can be obtained is by increasing fees for services rendered to those who have the largest share of the wealth of the community. And this is entirely fair, because the man who has much wealth has a larger financial stake in the welfare of the community as a whole than the man of small means.

Suppose that a man is able to earn just enough to support himself. Suppose that such a man should lose his earning power altogether and be sent to the County Farm to be supported at the expense of the community. Every taxpayer in the community would be obliged to pay a part of the cost of that support. The man of much wealth, paying more taxes than the man of small means, would pay a larger proportion of that cost than the poor man. Now, suppose that your service prolongs indefinitely the earning power of such a man, and prevents his becoming a charge on the community. You have saved the poor taxpayer a little, but you have saved the heavy taxpayer much in proportion. The slight addition to the fees of the wealthy to partially cover your cost in doing charity cases is very little in proportion to the amount you save him in taxes.

The case for "the classification of patients" as I see it, is as good as proved. It is tacitly accepted by those of large income, who usually expect to pay more than others. I know some who are offended when they are not asked to pay more, because they are vain of their wealth and want it to be recognized. Such people pay more for everything they buy. Of two articles of equal value but different prices, they will choose the more costly.

I shall be glad to hear from any reader on this subject.



Trade Mark

Dental Casting Gold and Solders

Formulae of DR. JOHN F. STEPHAN, Cleveland, Ohio.

Inquire about our No. 2 CAST CLASP METAL.

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The Miller Clinic Club

The "progressive clinic" put on at the recent meeting of the Ohio State by the Miller Clinic Club of Cleveland is worthy of special notice, covering, as it did, the entire subject of full denture technic, from impression taking to delivery. Different steps were presented by the following:

W. A. Loope—Technic of Impression-taking.

C. C. Rogers—Proper mixing of plaster for Impressions.

W. H. Harrison—Proper Treatment of Impressions.

S. F. Hirsch—Cast Materials and Cast Construction.

Edson Hill—Bite Plate Construction.

W. C. Stillson—Showing the change from the rest to the working bite and establishing central occlusion.

T. J. Hill—Selection of Teeth.

T. J. Phillips—Setting up Teeth and Articulation.

Ira A. Saum—Waxing, festooning and tin-foiling.

C. H. Scheu—Flasking and Packing.

Robert Armstrong—Completed dentures and milling.

A series of articles by Dr. Bernard Feldman begins in this number of THE DENTAL SUMMARY that is deserving of careful reading and earnest consideration. Dr. Feldman is dealing with a neglected field, one that offers much to the scientific investigator, the importance of which cannot be overrated. His matter is presented as plainly as possible, in the hope that many may be interested.

Protect papers from prying eyes

Guard against damage from prying eyes and the unconscious glance of visitors at your desk. It is convenient and efficient to always file confidential papers in a

Kleradesk

Filed vertically, important documents cannot be read; are out of way but immediately at hand when needed.

A Steel Sectional Device

Add compartments as required. Sections \$1.20 each. Four-compartment Kleradesk illustrated below only

\$6.00. Indexed front and back. Write for free, instructive, illustrated folder, "How to Get Greater Desk Efficiency."

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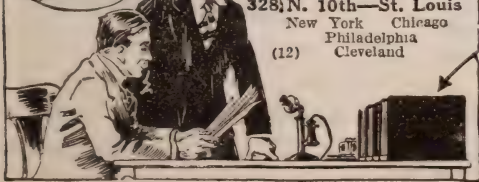
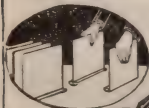
328½ N. 10th—St. Louis

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(12)



IPANA TOOTH PASTE

Heals Bleeding Gums

—the unanimous opinion of
dentists who know

IPANA contains Ziratal, which dentists have found to be effective as a healing agent in the oral cavity and is a recognized assistant to professional treatment in restoring soft, spongy and bleeding gums to normal.

Ipana is soothing to inflamed tissues, and its freedom from gritty substances makes it ideal for gum massage.

It is a thorough cleanser, whitener and polisher of the teeth, and the flavor is refreshingly different—it is smooth, snappy and delightful.

Certainly—
a professional package for
the asking.

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48 Rector Street

New York City

Makers of SAL HEPATICA



The scientific mind is one that holds itself open until all the evidence has been presented; that does not jump at conclusions; that is not controlled by prejudice; that does not try to make all new information square with pre-conceived ideas.

University of Minnesota has opened an extension course in dental hygiene for girls, with a registration of 25 students.

The first session of what is to be an annual event hereafter was held at Chattanooga, Tenn., on November 6—the meeting of the Tennessee Clinic Society. Drs. F. W. Hofer, of Nashville, and H. F. Marston, of Minneapolis, occupied the day, the former dealing with the surgical treatment of pyorrhea, and the latter with crown and bridge-work. Chattanooga was chosen as the permanent meeting-place.

Teeth and Feet, what might be called the two extremes, were awarded prizes in the contest during the health exposition held at Grand Central Palace, New York City, during the week of November 15. Unless these two sets of members are just about right, it really matters very little what lies between them, so far as health and efficiency are concerned.

Children of St. Paul schools, ranging from five to ten years old, have lost an average of 2 per cent. of their permanent teeth, as demonstrated by a recent examination of 1019 pupils of the public schools, conducted by dentists acting under the director of hygiene.

It is just as well to be a little careful in handling crowns and items of that kind while your patients are under a general anesthetic. Just the other day a dentist was sued for damages amounting to \$10,000 for having allowed a gold crown to slip down into the patient's lungs under the conditions named—and besides, he'll lose the gold! If you saw the exhibit at Columbus you will know that such accidents are by no means uncommon.

Later—The jury awarded damages amounting to \$3,500, which the dentist must pay.

The State Supreme Court of South Carolina has reversed a decision of the lower court sustaining the Board of Dental Examiners in revoking the license of a dentist, who advertised to extract teeth painlessly. This decision compels the Board to issue a new license. In handing down the decision the Supreme Court held that the painless extraction of teeth was a matter of common practice, with which post-extraction pains had nothing to do.

LISTERINE TOOTH PASTE

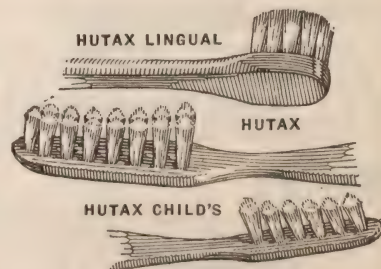
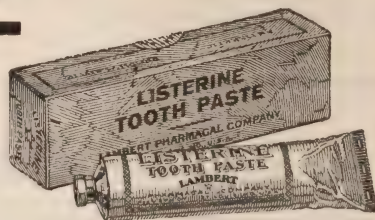
Composed of an unusually efficient neutral cleansing and polishing substance, flavored with the essential oils which impart to the antiseptic solution Listerine its agreeable odor and taste—slightly acidulated with a pleasant fruit acid which deters formation of "tartar" about the teeth and provides mild salivary stimulation.

HUTAX TOOTH BRUSHES

"Hutax" means Mouth Health

We have been appointed United States distributors for these brushes, which were designed by a Committee of Dentists of the International Oral Prophylactic Association. All profit accruing to the Association from their sale is expended for research or education.

The Hutax brush, used in conjunction with the Hutax Lingual brush—which is particularly suited to cleansing the inner surfaces of the incisors, regulating appliances and bridge work—provide the most approved means of tooth brushing. Particulars gladly furnished on request.



Cuts Two-thirds Actual Size

LAMBERT PHARMACAL COMPANY,

Saint Louis, U. S. A.

A Vienna, Austria, dentist performed an operation upon himself not long since that he is not likely to repeat—he's dead! In the effort to devitalize a pulp he accidentally swallowed the pellet of cotton saturated with arsenous acid, carbolic acid and cocain, and died the next day of acute septicemia.

Diet has more to do with dental caries, pyorrhea and other mouth-troubles than all other causes combined, and those "other causes" would not exist did we select our diet with anything like the care exercised by the ordinary Norway rat. Calcium, phosphorus, iron, vitamins from raw vegetables, alkalin rather than acid—these are essential to the health of the body, including the teeth. Dr. Clarence J. Grieve, now chief of dental staff at Johns Hopkins, is conducting a series of experiments that will demonstrate these and many other things before long. He already says that we should eat more dairy products, more salads, more "greens," more visceral foods, and that suitable diet will prevent most of the diseases of the teeth and gums.

Not long ago a very well known physician visited a dental supply house in one of our larger cities and bought a complete set of forceps, exolevers, etc., stating that he was

"tired of hearing of the extortionate charges of exodontists," to whom he had been referring patients for extraction, and that he purposed doing his own extraction thereafter. Maybe he was justified, and maybe he wasn't. I do now remember to have heard of dental fees running from \$2 to \$2,500 a minute, but there may be such cases. Plenty of them in general surgery. Just the same, the exodontic brethren should take care not to kill the goose that lays their golden eggs.

If George Washington had been called upon to wrestle with modern dietary iniquities, it is doubtful if he would have been able to "get by" with his walrus-tusk teeth. Are you interested in diet? Do you really want to be well? THE SUMMARY means to devote some little space to such matters hereafter.

Forsyth Dental Infirmary celebrated its seventh birthday on November 21 by appropriate exercises before a large body of dentists and physicians. Regular and special clinics were given before the opening of the exercises, including operations for adenoids and tonsillitis. The occasion marked the conclusion of seven years of usefulness and service.



ASCHERS' ARTIFICIAL ENAMEL "IMPROVED 1920"

Superior to Any Other Tooth Filling

Free Samples of IMPROVED ASCHERS POWDER and LIQUID furnished by Dental Supply Houses.

SPECIAL INTRODUCTORY OFFER:

On receipt of One Dollar, we will send you by Insured Parcel Post, Charges Prepaid, an extra Large Sample Bottle of IMPROVED ASCHERS POWDER and LIQUID, any color demanded, DIRECTIONS for Use, Price List, etc.

THE ASCHERS IMPORT CO., Ltd.

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CLEVELAND, OHIO

Indiana—Isaac Knapp Coterie

The annual election of officers of the Isaac Knapp Dental Coterie, Ft. Wayne, Ind., resulted—President, H. T. Berkey, Vice, S. J. Purviance, Secretary, J. C. Weatherhalt, Treasurer, J. S. MacCurdy. A series of interesting meetings is planned for the season.

Tennessee—Tri-State

Memphis, Tenn., Nov. 4—Dr. J. H. Meeks, of Humboldt, Tenn., was elected president; Dr. C. A. Seviere, Jackson, Tenn.; Dr. J. D. Jordan, Little Rock, and Dr. H. D. Chipps, Corinth, Miss., vice presidents, and Dr. T. R. Ogden, Memphis, secretary-treasurer of the Tri-State Dental Association, which closed its annual meeting here today.

Memphis was selected as the permanent meeting place. A new constitution and by-laws were presented by a committee composed of Dr. G. C. Powers, Memphis, Dr. E. D. Hood, Tupelo, Miss., and Dr. J. D. Jordan, Little Rock and adopted without discussion.

One of the most interesting talks of the general meeting was made by Dr. A. G. Buckner, of Nashville, assistant secretary of the Tennessee board of health, who was the guest of the convention.

Dr. J. A. Gardner, chairman of the clinic committee. Arrangements for the convention were handled by a committee headed by Dr.

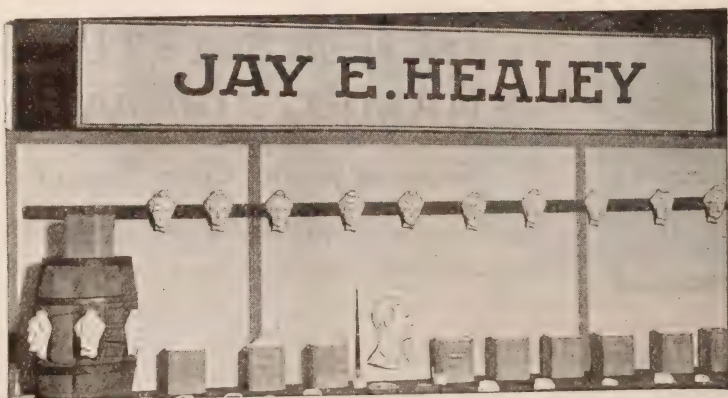
R. E. Baldwin and the publicity committee by Dr. G. L. Powers.

The convention closed with a banquet at the Colonial Country Club, at which Dr. E. D. Hood acted as toastmaster, and at which a number of visiting dentists made short talks.

Three famous dentists and their wives attended the dental convention at Mexico City, Mex., December 26-31—Drs. Edouard M. Hall, Dayton Dunbar Campbell, and Henry W. Allen, all of Kansas City, Mo. All of them were on the program for papers and clinics.

Dr. O. A. Van Kirk, who has practiced dentistry at Wolcottville and Kendallville, Ind.; for the past eighteen years, and who has occupied many offices in dental organizations, left for California November 22, where he is to assume charge of the business of the Kolynos Company in that state. Dr. Van Kirk has our best wishes.

A card has been received at this office announcing the marriage, on Saturday, December 31, 1921, of Dr. Henry Earley Nixon and Miss Norma Gladine Chesson, of Mackey's, North Carolina. The young people will make their home at Edenton, N. C. THE SUMMARY extends best wishes for a sane, safe and happy voyage over life's troubled sea.



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Dentistry for Ex-Soldiers

VETERANS, TO RECEIVE TREATMENT, MUST
COMPLY WITH THE CONDITIONS
PRESCRIBED.

An outline of the procedure for ex-service men to obtain dental treatment has been prepared by the national service division of the American Legion.

Dental treatment will be furnished by the bureau of war risk insurance to veterans of the World War under the following conditions:

1. Where a person has been awarded compensation for dental disability.
2. When such treatment is necessary for the cure of a condition which resulted from military service and is the reason for which compensation has been awarded.
3. In emergency cases which are immediately necessary for the relief of conditions endangering the life of the patient or causing great pain.

Claimants who have not been awarded dental disability, but feel they should have such due to military service, should immediately file claim in the regular manner; whereupon they will receive an order from the district medical supervisor to report to the nearest dental examiner for examination and such emergency treatment as may be required. Approval of the dental examiner's report must be made by the bureau of war risk insurance.

To receive the benefits of the dental laws, claimants must pursue their case through the regular channels, as bills contracted outside of the authority of the bureau of war risk insurance will not be paid, except where sufficient evidence is produced that the case was emergency or that the claimant was ignorant of his rights to dental treatment.

The United States Civil Service Commission announces an open competitive examination for dentists and surgeon's assistant and dental hygienists. Vacancies in the Public Health Service throughout the United States, at the compensation fixed by that service of \$80 a month, without quarters, subsistence, or laundry, for dental and surgical assistants, and \$1,560 a year without quarters, subsistence and laundry, and vacancies in positions requiring similar qualifications, at this or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

The usual qualifications apply. Applications will be rated as received until March 31, 1922.

For further information address the United States Civil Service Commission, Washington, D. C.

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The State Board of Michigan has been sued by a dentist for \$100,000 to whom they refuse to issue a license, it is alleged, on the ground that he was an advertiser and unethical, and who afterwards secured license by mandamus procedure through the courts. The outcome will be interesting.

A Real Sportsman

Many farms in eastern Ohio are placarded with "No Hunting" signs, but the big farm near Woodsfield, in Monroe county, owned by Dr. W. W. Scales, a dentist, is different. Dr. Scales, himself an ardent sportsman, has posted welcome signs for nimrods reading:

"Hunt when you d— please, and when the eat gong sounds, come to dinner."

DEATHS

Ben Worrall has passed to the Beyond. Everybody in the dental business and nearly everybody in the dental profession knew Ben—big, hearty, hail-fellow-well-met Ben Worrall. There was a time that no convention or exhibit seemed complete without his big personality and bigger voice, and he has been and will be missed on such occasions. An announcement sent out by A. C. Clark & Co. is well worth reproducing here:

"Although physically impaired for many months back, he was ever mentally alert, his indomitable will and determination courageously sustaining the spark of life weeks after his friends had relinquished hope.

The Dental World was his world; he loved it; he lived it and was unyieldingly active in it to his last conquering sleep.

We miss him; so will the legion of his friends in the Dental Industry but we all will forever cherish his memory."

The John Hood Company, Boston, announces the death of its President, Mrs. Georgiana Hood, on Wednesday, October 19, 1921.

At Camden, N. J., November 12, of heart disease, Dr. Charles P. Tuttle, aged 62.

At Cincinnati, November 8, Dr. Robert M. Lowe, aged 80.

At Wichita, Kansas, November 12, the body of Dr. Herbert L. Kells, of Coffeyville, was found floating in an abandoned shale pit, with one side of the head crushed in. Murder is suspected, and one arrest has been made.

At Bristol, Tenn., November 8, Dr. Charles G. Aven, aged 52.

At Baltimore, Md., November 14, Dr. Douglas Malcolm, aged 68.

At Guatemala City, Guatemala, June 20, Dr. Frank M. Johnson, formerly of Mocksville, Davies County, N. C. Seventeen years ago

Dr. Johnson married the daughter of a minister, and shortly thereafter disappeared. That was the last heard of him until a letter came announcing his death. He had married in Guatemala, and had a son and a daughter attending school in New Orleans.

At New York City, November 21, of pneumonia, Dr. Edward Augustus Bogue, aged 83. He began practice in New York in 1864, opened an office in Paris, France, in 1877, and thereafter, until 1900, spent half of each year in Paris, where he had many notables among his clientele, including many of international fame. He was a member of national and international dental societies, and well known on both sides of the Atlantic.

At Detroit, November 12, Dr. Wellington A. Banks, aged 62. Dr. Banks was honored as the dean of the dental profession in Detroit, where he had practiced for over 38 years.

At Plain City, Ohio, November 16, of paralysis, Dr. Elbridge Calvin Robinson, aged 71. He grew up, led all of his active life, and finally passed away within a few miles of the place of his birth, honored, respected and loved by all who knew him. He embodied in himself all that was best of the dentistry of an older time, and numbered among his patients many well-known people. He had practiced at Plain City for more than fifty years.

At Battle Creek, Mich., November 17, of dilation of the heart, Dr. Frank H. Honey, aged 65. He was one of a well-known family of dentists practicing in Michigan, and was himself very widely and favorably known.

At Philadelphia, Pa., November 27, of heart trouble, Dr. Victor Cochran, son of the late John P. Cochran, governor of the State of Delaware. He had practiced in Philadelphia twenty years.

At St. Luke's hospital, December 1, of nephritis, Dr. P. B. Welch, aged 55.

At Stamford, Conn., December 1, Dr. Frederick C. Lambert, of Greenwich, Conn., committed suicide by shooting. Overwork had caused the mental strain that affected his mental balance.

At Oakland, Cal., December 1, Dr. Frank P. Gaines, formerly of Richmond, Mo.

At Brooklyn, N. Y., November 16, Dr. William Jarvie, aged 97.

At Salem, Ore., November 10, Dr. Clarence Hartley, aged 45.

At New York City, November 27, Dr. Frank S. Hutchinson, aged 35.

At Honolulu, Hawaii, December 15, Dr. M. E. Grossman, formerly of Chicago.

At Liberty, Indiana, Wednesday, November 23, Dr. B. F. Johnson. An obituary will be published in the next issue of THE SUMMARY.

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XLII

FEBRUARY, 1922

No. 2

FUNCTIONAL ANATOMY OF THE TEETH.*

BY F. W. FRAHM, A.B., PH.G., D.D.S., LOS ANGELES, CAL.

PROFESSOR OF PROSTHESIS, COLLEGE OF DENTISTRY, UNIVERSITY OF SOUTHERN CALIFORNIA

THE study of descriptive and functional anatomy of the teeth has been sadly neglected by a large per cent. of the men engaged in the active practice of dentistry. A great deal of time and effort is being expended by some men at this time upon the study of the teeth of the carnivora, *Prosimiæ* (Lemurs) primates, with a hope that this study may reveal the connecting link between dentition of these and the teeth of the human. Interesting as such a study may be, it does not help the rank and file of our men to intelligently reproduce the lost or impaired units of mastication and make them function as they should.

It is not always possible to get the results that are seen in an ideal articulation, but the operator should ever keep it in his mind and work toward it as far as existing conditions and modifications will permit. To attain such ideal results, the operator must first have a vision of the ideal articulation, and know the form and function of each unit, before he can or should attempt to restore or reproduce such units or section of units to an ideal articulation. With the ideal in mind, it is not a difficult matter to modify it sufficiently to meet any variation a case may call for.

The writer does not claim to know all that God had in mind when He created the human articulation and the teeth as we know them. However, he is of the opinion that each tooth and each surface contour has its own peculiar outline, made to conform to a very definite functional requirement. The small differences in details that may be seen in different types of teeth as pointed out by Dr. Leon Williams and other investigators, do not materially alter the function of such units or their several surfaces, while they are in position in their respective arches. However, it is quite evident from a careful study of the several units of each arch that there was a very definite plan underlying the form, contour, and general arrangement of the teeth that has adapted them to their functional requirements as units of the whole.

*The third of a series of articles on Crown and Bridge-work being written exclusively for THE DENTAL SUMMARY.

Our present mode of living has had very little if any modifying influence upon tooth forms. Its influence has largely been upon their arrangement and their osseous support. Where the ideal in the building of the arch has been interfered with, we frequently have a destruction of tooth-contour by decay, but rarely any disturbance in the functional anatomy of the teeth themselves. Such functional changes, if any, are usually found in the third molar and laterals. Yet it must be remembered that even in these nature makes an effort to build them true to type, though they may never function as masticating units.

The teeth are hardened, calcified elevations, or end-organs of dermoid origin, placed upon or attached into the bony skeleton of the mouth. They are so arranged that they assist in seizure and mastication of food. In order that they may properly function and prepare the food for ingestion, they are arranged in two opposing and symmetrical arches that form two parabolic curves. To properly articulate and function, the incisal edges and occlusal surfaces of the teeth must harmonize with these curves and the inter-maxillary arrangement of the units of the opposing arch. During mastication the several cusps that are engaged in the sectioning and cutting of the food must be arranged in a manner that will permit them to glide through their respective notches without any lateral strain upon their opposing units.

(*Fig. 1.*) These opposing triangular notches, with apex down or up, are formed by the medial and distal inclined planes of all the cusps. When these inclined planes are in normal relation and functioning as nature intended they should, the bucco-lingual inclined planes of the bicusps and molars of both arches will form the rectangular groove. (*Fig. 2.*) The main function of this groove is the crushing of the food while the cheek and tongue carry it into this space.

The free and easy gliding of the mandibular teeth over the surfaces of the maxillary teeth during mastication is dependent upon the influence of several factors.

1. Every unit of each arch must be in a normal position and approximate in a manner that will permit every inclined plane and ridge of it to function with the antagonizing inclined planes and ridges.

2. Every unit must be in proper relationship and contact with its neighbor to permit the forming of a correct embrasure and interproximal contact that will direct the crushed food in the right direction without inflicting injury to the intro-proximal and investing tissue of the teeth.

3. Each unit of either arch must have a position in a manner that will not cause an interlocking of the cusps or cause an impairment of the function of the rectangular groove or strain upon these units. Each cusp must be formed in a manner that will permit its several parts to function without interfering with any other.

4. The several units of both arches must be arranged in a manner that will permit the moving mandible to function without strain to either its muscular or ligamentous fastenings, or cause a retrogressive change to

take place in the temporo-mandibular articulation.

5. The several units of each arch must be so arranged and their cusps and inclined planes curved to harmonize with the type and size of the mandibler, its suspended relations, and its interarticular relations to the maxillas, if we would function without strain or retrogressive changes.

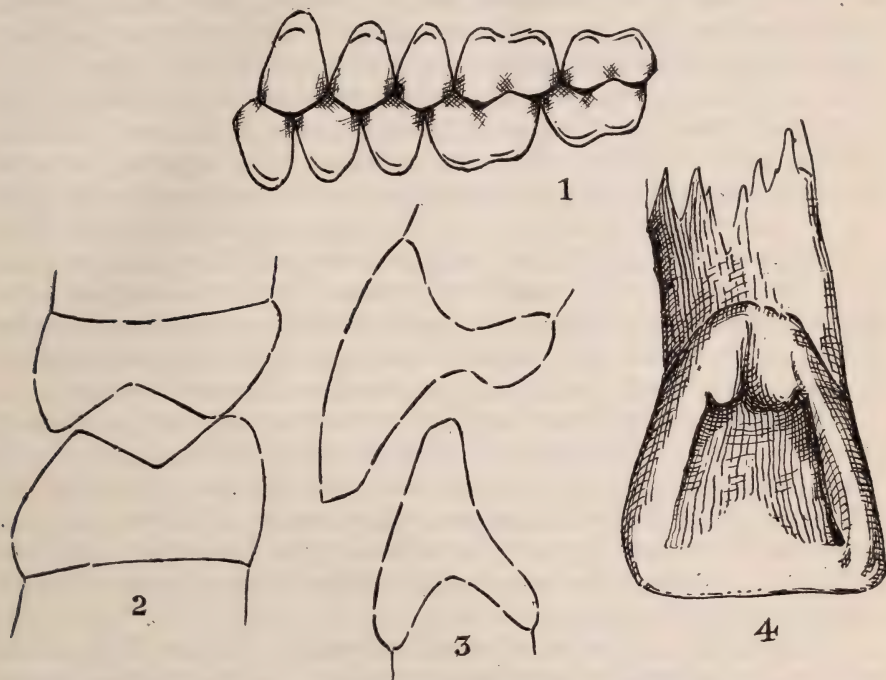


Fig. 1—This was drawn to show the relation of the buccal cusps of the bicusps and molars and the cusps in their respective notches formed by the medial and distal inclined planes of the opposing teeth.

Fig. 2—A bucco-lingual cross section of a maxillary and mandibular molar in cusp to cusp relationship. When all the teeth on the working side are in this relationship, the bicusps and molars will complete the rectangular groove. This groove is bounded laterally by two active and two passive inclined planes. Anteriorly by the cusps, and distally by the distal marginal ridges of the third molars.

Fig. 3—A cross section of the maxillary and mandibular centrals to show the chisel-like action of the mandibular incisors against the anvil-like surface of the maxillary incisors.

Fig. 4—The lingual surface of a maxillary central to show its highly specialized surface and functional anatomy. Two well-defined marginal ridges that unite near the gingival to form the tuberosity and enclosing within this area a concave surface in every direction. This surface terminates in the gingival third in a distinct fossa.

The units of the maxillary arch function somewhat different from their corresponding opponents of the mandibular arch, because they are a part of the fixed or immovable half of the masticating apparatus. In a general sense they are considered the anvil; while those of the mandible function as chisels and hammers.

This general difference in function will of necessity account for some of the differences in the contour and general markings of the mandibular teeth from those of the maxillary arch.

It is not the writer's intention to take up the study of the anatomy of the roots and their several cones, other than just calling attention to the difference between the root anchorage of the maxillary teeth and their mates of the mandibular arch. There must be a good reason why a maxillary first-molar crown is supported by a three-coned root and the mandibular first molar by a two-coned root. Likewise, there must be a very good reason why the cones of the mandibular first molar are positioned medio-distally in the arch, while those of the maxillary first molar are not. This arrangement is not merely a matter of chance but in harmony with functional stress-requirements and laws of force. It is a recognized law that any object which is to receive an impact from a moving object of similar size must be more firmly anchored than the moving object, in order that it may withstand the stress, whatever that load or strain may be.

The direction and nature of impact or stress will have to be provided for in the root anchorage for the tooth crown. Such anchorage and stress should receive a very careful study and consideration when one or more units of the arch are to be involved in the construction of a fixed bridge or even when they are to function as retainers in a removable bridge.

The operator who passes very lightly over such a study or does not even give it any consideration, is, to that extent, inviting failure for, or limiting the usefulness of his appliance. Not infrequently a very nice piece of bridge-work fails after a short term of service. This may be due to loosening or breaking down of the anchors or the destruction of the supporting teeth, because the operator did not give functional stress the study it rightly should have had.

The maxillary centrals and laterals are usually thought of as cutting teeth, to the exclusion of every other function. In the primitive days of man, these teeth may have functioned as organs of prehension; but, in this highly cultured era, prehension with these teeth is frowned upon by the ethics of good society. Also, the function of cutting—if it ever existed—is being limited by the same organization. However, there still remains one function that never will be limited or abolished. These teeth will continue to function as the anvil or buttresses upon which the mandibular incisors may exert their cutting stress. (*Fig. 3.*)

If you will bite into an apple or pear you will observe that the maxillary incisors do not function as cutting units, unless you twist the fruit along an arc different from that it would naturally take. It would also be noted that the mandibular incisors were completely buried in the fruit, even to a depth that would include some of the tissue covered alveolar process.

The lingual surface of the maxillary centrals and laterals are physiologically adapted to this function. (*Fig. 4.*) A study of these surfaces will show a concavity the arc of which decreases as we reach the gingival portion, which frequently terminates in a singulum or tuberosity. The curvature of this surface and the confining influence of the medial and distal marginal ridges enable the mandibular incisors to function as true cutting or incising units.

This anvil-like function of the maxillary centrals and laterals has always been the most important, as is evident from the great difference between the labial and lingual surface anatomy. The labial surface of the maxillary central or lateral is practically functionless. True, it aids in the esthetics and facial contours, but not in mastication, while the labial surfaces of the mandibular centrals and laterals do function in mastication. These teeth are built more wedge-or chisel-shaped, with a more or less straight incisal to gingival surface. However, the gingival third of these two surfaces has a marked convexity, thus enabling these teeth to penetrate food with a minimum damage to the investing tissues. Thus when called upon to make a crown or restoration that will involve the gingival on the labial or lingual surface, we should develop either of these surfaces with more convexity than the gingival third of the labial surfaces of the maxillary centrals and laterals.

The lingual surface of the maxillary centrals and laterals has a very highly-developed functional surface. Medio-distally this surface is mostly concave with strong convex margins. These margins direct most of the food toward the gingival singulum, allowing about the right amount to pass over these convex margins, to stimulate the septal tissues and thus keep them in the pink of condition. The medial marginal ridge is somewhat stronger and inclines more distally in order that it may direct the food away from the papilla palatina or pad overlying the anterior palatine canal and thus protect the blood vessels and nerves that pass through it.

At the point where the two marginal ridges join the tuberosity or singulum we may see one or more small fissures or grooves. These are provided for "juice-ways" and aid in the cleansing of that area, the fossa and the gingival tissues. When inspecting these surfaces from the incisal toward gingival we have a mold-board effect, with an enlargement at the gingival. Thus this surface directs the food distally with the least injury to the mucose tissues and the investing tissues of these four teeth.

All crowns that are made upon the roots or stumps of these teeth and do not reproduce these features are to that extent harmful, and will shorten the life of these units of mastication. When certain manufacturers announced that they would bring a new crown for the anterior teeth upon the market the writer did hope that they would not neglect this functional surface of the maxillary centrals and laterals. But *they did*.

*Sixteenth and Los Angeles.

PRINCIPLES OF RETENTION OF ARTIFICIAL DENTURES*

BY A. J. MIELKE, D.D.S., MEMPHIS, TENNESSEE

THIS SUBJECT NO DOUBT has been discussed from various angles since time immemorial; various experiments made and physical laws considered, conclusions formed and various papers written and discussed as they relate to this principle.

It is the writer's endeavor to add another contributing factor. While probably not new in the field of thought, yet he gladly submits his findings for what they may be worth to the profession.

One great author and writer on prosthetics has this to say regarding atmospheric pressure as a factor, in part:

"As is well known, atmospheric pressure is the weight of a column of air at sea level, 14.7 pounds to the square inch, and decreases in ratio to the height above sea level. As this pressure is equal in every direction upon and within the human body, it is not perceptible. Whenever a portion of this column of air is removed from a circumscribed portion of the body, its effect is immediately felt.

"Atmospheric pressure *may be utilized* to retain an artificial denture, but through the medium only of a vacuum chamber. Since an absolute vacuum is an impossibility, the amount of retention by atmospheric pressure is contingent upon the square surface of the chamber and the vacuity obtained. To produce any degree of vacuity it is necessary to have the plate surrounding the vacuum cavity perfectly adapted to the soft tissues.

"Retention by atmospheric pressure can only be temporary, and maintained only so long as there is a partial vacuum. The effect of the vacuum chamber upon the tissues of the mouth is the same as cupping in medical practice. As soon as the atmospheric pressure is reduced upon a circumscribed portion of the body, it acts as an excitant, causing an increased blood pressure in the part, with temporary swelling; and if continued a proliferation of tissue cells, producing a permanent growth until the chamber is filled. When the chamber is filled by tissue and the fluids of the mouth, atmospheric pressure can no longer exist; the denture is then retained only by adhesion, by contact, without attempting an explanation of how the suction is secured.

"When masses of matter are brought into mechanical contact and are caused to adhere by a film of non-adhesive fluid, it might be thought that the adhesion is due to the strength of the fluid; but this is not the case, because the thinner the film the greater the adhesion. That this adhesion is not due to atmospheric pressure may be demonstrated by

*Read before the Tennessee State Dental Association, May, 1921.

suspending two masses of matter adhering by contact in the chamber of an air pump and exhausting the air, when the adhesion will remain the same or stronger than under normal atmospheric pressure."

Another authority states that retention is secured by the combination of atmospheric pressure from without and the intermediate saliva. These conclusions as I recall were formed after various experiments, such as moistening a coin and placing upon a smooth surface establishing contact. Impressions of mouths of cadavers were made, and the conclusion formed that due to the absence of intermediate saliva, no retention was procured.

Quoting further from my first author:--

MUCOUS MEMBRANE

"This membrane must bear the burden of supporting all completed artificial dentures; therefore an appreciation of its capabilities is an important factor to the prosthetist. In examining the mouth prior to taking the impression the condition of health of this tissue over which the base plate is to be placed should be noted, and if necessary, the required attention given. There are two qualities of this membrane to be considered, tone and tension."

tone

"This membrane is much influenced by the health of the individual and may be quite an index of the condition of the general system. The patient will learn that when the general system is vigorous and rested, the denture will have its maximum retention, but when the system is debilitated or relaxed from temporary exhaustion—tired—the dentures are not 'sticking up' as well as they did, it is well to investigate the tone of the system and explain this principle."

FLUIDS OF THE MOUTH

"The normal watery fluids of the mouth are more favorable for retention by adhesion by contact. The fluids make the contact, but do not hold the base-plate so far away as to interfere with the adhesion by contact. When the fluids are vitiated, thick and ropy they may have sticky properties, but not enough to compensate for the interference with adhesion by contact."

While intermediate saliva and atmospheric pressure, no doubt, are contributing factors, and have their indirect bearing as to retention, it cannot be stated with any assurance that they are perpetual. Let us go a step further into the matter by sighting only a few cases with a pathological history, as it relates to retention.

Case No. 1. Mr. W. Age 70, four years ago; upper and lower dentures; impression taken in the morning. Impression seemingly perfect. Patient inclined to be diabetic, varied blood pressure and toxic. After completion of case, patient came back after a few weeks stating that when he arose in the morning he could hardly get denture out of his mouth and that retention was very good, but as the day wore on it became loose and dropped down with apparently no cause. After

careful examination, I was at this time unable to form any definite conclusion as to cause of failure, in view of its fitting perfectly in the morning.

Case No. 2. Mr. W. Age 56, three years ago; upper denture. History: Improper elimination, blood pressure varied, impression taken in morning. Patient returned after a few weeks complaining that denture constantly dropped, seemingly fitting better at times than others. Made another, and after a time patient returned stating that retention seemed somewhat better, but at times got very loose, particularly in the afternoon. Being unable to find any defect in the work I came to the conclusion that there was evidently some systemic condition underlying the cause of failure.

Referred patient to family physician for thorough examination with request that report be made to me. Result: Varied blood pressure, tending to be low, toxic, casts in urine. Upon this finding I advised him to wait until his condition was normal and to procure treatment from his physician. After a period of several months, and upon receiving a favorable report from the physician, I again made another, this time taking impression late in the afternoon. Patient now retains and has been using denture for a period of months with apparently no complaint.

Case No. 3. Mrs. R. Age 50, eighteen months ago; highly nervous, upper and lower denture. Impression taken in the morning. After a few weeks patient returned, complaining that every afternoon between 4:00 and 4:30 P. M. denture became very loose and just wouldn't stay up; however, during the morning hours retention was very good.

Having in mind various other failures of retention not herein mentioned, I made an appointment for the following week for 4:30 P. M. at which time another impression was taken and new denture constructed. After seeing the patient on several occasions after completion of second case for minor adjustments, she remarked at time of these various visits that the retention was all that one could expect, and after almost a year I have not received any further complaint.

Following the above cases up closely in connection with others over a period of several years as to the various causes of retention, I came to the conclusion that systemic conditions have their indirect bearing. After considering the subject from various angles, giving much thought and discussion to same, I decided to submit my findings as they related to systemic conditions to a pathologist, bacteriologist, and internist.

Basing our decision on urinalysis, the specific gravity being more normal in the average patient in the morning than in the afternoon, the variation depending on amount of water drunk during the day, throwing off waste matter and dead tissue cells, that if the various organs were affected, the sub-mucous covering of the epithelial cells and palatine-gland would also be affected causing a degree of tissue change. Various systemic conditions such as high or low blood pressure, toxemia, im-

proper elimination, colds, nervous and diabetic patients, etc., would have a direct bearing not alone on the tissue cells but a variance in the capillary expansion and contraction. The theory was further advanced that in a younger patient under 45 years of age the resistance was much greater than in an older one, and that the building up and tearing down was less in the former than in the latter. Further that the heart action was much stronger.

Systemic conditions being considered an important factor as it relates to retention, I invariably determine before impressions are taken whether the patient is suffering from any of the above physical ailments. Further regardless, I take impressions for patients over 45 years of age as late in the afternoon as possible. As the day wears on and the patient is more or less fatigued and tissues affected as a normal result of the activities of the day, we procure a more normal impression of an abnormal condition at this time than in the morning under normal physical conditions. In doing this we come to a happy medium and establish a normal result as it applies to the fitting qualities of retention.

Adrenlin chlorid has been and is used to obtain capillary contraction previously to taking impression of a maxillary denture. By the time the denture is completed the tissues of course have returned to normal. Believing that capillary expansion is an important factor, establishing hyperemia, as it applies to retention, we must produce as near a perfect adaptation of maxillary denture as possible.

As to perpetual retention this is another factor which cannot wholly be overcome. First of all as stated above, in younger patients the cells are continually rebuilding and replacing those lost due to natural causes; while in an older one, the building up is somewhat slow if at all. Where there is continuous mechanical pressure, adhesion and capillary contraction, causing an abnormal supply of blood to a part, after due course of time we are going to have atrophy of the epithelial covering and sub-mucous tissue and more than likely absorption of the osteoblastic cells; however it is the writer's belief that if pressure is relieved over the area of the anterior and posterior dental foramen, it will permit a freer supply of blood to the parts under pressure and atrophy results somewhat more slowly.

If atmospheric pressure and intermediate saliva were perpetual factors, it seems it would not be necessary to seal the periphery and post-dam. Therefore an equalization of pressure is necessary, depending on the classification of tissue upon examination at the time impression is taken resulting in proper adhesion and capillary expansion; of course taking the physical and mechanical facts into consideration as to the ultimate success of the denture.

Having considered the pathological cause of failure we will next consider the mechanical. While we will agree that without a good impression we cannot construct a satisfactory case, I might mention just

a few high spots which are important links in the chain of success, namely:

Impression.

Base-plates.

Correct bite.

Articulator.

Correct and incorrect way to place models and bite on the articulator.

Selection of teeth.

Getting balanced bite.

Occlusion.

Leverage.

Placing finished case on articulator properly, preliminary to grinding the teeth automatically.

Upper buccal and labial flanges should neither be too high nor too low.

Frenum outline in upper finished case should not be cut out mechanically. This should be properly accommodated at time impression is taken.

Proper measurements should be taken previously to extraction of teeth, in order to establish normal bite range in finished case.

These conclusions have been arrived at from practical and clinical experience covering a period of years. I trust the suggestions herein mentioned will be as helpful to others as they have been to me.

As turning the logs make the dull fire burn, so will the turning from one subject to another, as the varied types hit the eye, make the mind sparkle. Opinions are largely formed from observations, but all observers stand upon different peaks. Your peak may be higher than mine, but I may see down into the valley which your eyes have never scanned.

All the world is a stage, but life won't be a tragedy nor a comedy if you play your part well.

320 Madison Ave. Bld'g.

THE PSYCHOLOGICAL FACTOR IN SECURING
CENTRAL OCCLUSION*

BY DAYTON DUNBAR CAMPBELL, D.D.S., KANSAS CITY, MO.

THE "CENTRAL OCCLUSION" DESIRED by the prosthetist is the normal or natural occlusion of the patient. This normal or natural occlusion is easiest to obtain when the other actions of the patient are normal or natural. These actions are normal or natural or habitual when the patient's processes of thought are following accustomed or habitual channels. The problem of securing or maintaining this mental condition is the psychological problem confronting the prosthetist when he wishes the patient to close upon the occlusal rims.

The psychological factor involved in the process of securing central occlusion is so important that the writer is tempted to assert that it outweighs the physical or mechanical provisions together with the physiological considerations of the case. The writer believes that all of his hearers are agreed with him that the psychological factor in denture construction can be so vitally effective in a negative way that the most exact workmanship as well as the most favorable conditions of mouth tissue will not assure successful dentures.

In making preparations to secure central occlusion we should bear in mind that the closing movement desired is in many respects similar to other movements which, taken in series, form habits, and which, as habits, are usually performed most easily when the mind of the performer is not concentrated upon any particular movement of the series. The effort to separate an act from the series in the midst of which it usually occurs is often not only confusing but utterly unavailing. In fact, some of the most simple habits we have never analyzed; for example, in dressing—do you put your right arm into your coat and then put in your left, or do you first put in your left? In jumping a running broad jump do you "take off" from your right foot or your left? In starting your follow-through stroke are your elbows above the plane of your hips or below? In getting off a moving train from the left side is your left or right foot the first to touch the pavement? Is it the same when you alight from the right side? (Of course, in the case of a woman alighting from a street car it's probably wrong!)

Such instances will serve to emphasize the difficulty confronting the patient if he is asked to close "naturally," or when he is told that we are now going to get "your regular bite." He has probably never until that moment thought of how he has been in the habit of closing his jaws; and his confusion will be greater than that caused by the questions we have

*Remarks while giving a clinic before the Northern Ohio Dental Association, June, 1921.

just suggested, because of the fact that it is even more unlikely that he has analyzed this movement. So, if instead of asking a singer to sound a particular note which occurs in the middle of a melody, we ask her to sing the melody and we prepare ourselves to take notice of the peculiar quality of the note as she sings; or, if instead of asking the pianist whether he starts the difficult arpeggio with little finger or thumb, we watch the fingering of the measure while the selection is being played, we shall obtain a more satisfactory reply than if we insisted upon the singer's or player's unnatural and non-habitual concentration upon a unit of the series. Likewise, if the prosthetist can take his central occlusion from a series of closing movements made by the patient, he will secure a habitual relationship of upper and lower which, incorporated in the artificial den ures, will be found to be correct.

While the factor to which we are calling attention is a mental one, it is influenced very largely by material factors which are almost wholly within the prosthetist's control. Consequently, the psychological problem is in large measure solved when the prosthetist has made careful preparations in anticipation of the final movement in the procedure.

Quite obviously, the material factors which will be most vital in securing central occlusion are the occ'usal rims. These should be constructed with much care, and the finish and polish shou'd be comparable, so far as the material permits, to the finished dentures. In constructing these, the depth of the wax is always left greater than the operator believes the case will require, since it will be easier while he is at the chair to cut them down than to build them up.

The upper is placed in position and retained without any doubt by the assistance of some one of the gum tragacanth or similar preparations available. After marking the median and lip lines, it is removed and the six anteriors of the teeth selected for the case are waxed securely in position and returned to the mouth in an alignment that is satisfying to both patient and prosthetist as well as to relatives or accompanying friends, who we insist *must be present upon this occasion*. The upper is removed and the wax posterior to the cuspids is cut away, forming a wedge-shaped ridge in order to offer less resistance in the moment of closing.

§ The lower occlusal rim is placed in position, the lower lip line noted and then removed. The excess wax above the lip line is cut away the entire length of the rim, and in many instances it is necessary to shorten the base at the tuberosities three-eighths to a half-inch, in order to assure in the act of closing freedom from interference with the upper. The entire body of wax to be occupied by the six lower anteriors is cut away and a central incisor placed in the median line in order to maintain the lip line and also serve as a stop when the jaw closes to central occlusion. The entire surface of the wax is again smoothed.

With a sizzling hot spatula the remaining body of wax on each side of the lower is softened through to the base everywhere, except at the confining borders, until each is a veritable pool. The upper occlusal rim is now

placed in position and as soon as the pools of the lower have congealed sufficiently to keep them from overflowing, the lower is inserted and held in position on the ridge, using the index finger of each hand for this purpose. The patient should be sitting erect with head free from the head-rest, or standing with face toward the light. As the operator approaches the patient with the lower ready to insert, he opens his own mouth rather wide and the patient responds to the suggestion by opening his mouth in like fashion to receive the occlusal rim. When the rim is in position and held as we have indicated, the operator closes his own mouth with a click or snap to central occlusion and the patient responds to the suggestion with a similar action.

The physical behavior following the first sense of touch which comes at the moment of practically non-resisting contact of the lower with the upper, is similar to any other habitual response to a stimulus, and having no other guide (of course, the soft wax is not a true guide, such as the planes of the cusps of the teeth provide), the mandible closes in correct relationship to the maxilla. The lower central incisor, which has been placed in or near the median line, touches the wax immediately behind the two central incisors of the upper and the closing movement is arrested with the lips in proper relationship.

In summarizing the whole viewpoint as presented, the following concrete suggestions presented in negative form may be practically helpful:

First. Never mention to the patient any specific movement desired, such as *correct bite*, or suggest that you want to get the *natural* or *normal* relationship of the jaws.

Second. Never sound a note of disapproval because of any movement that the patient may make.

Third. Never show by facial expression your disapproval or disappointment when movements of the patient do not contribute to success.

Shukert Bldg.

NOT "WHO you are!"
but "WHAT you are!"
is the real question.

WHY WE NEED THE HYGIENIST

BY ALFRED C. FONES, D.D.S., BRIDGEPORT, CONN.

BEFORE TALKING on the subject of the dental hygienist, I wish to analyze with you some of the main problems regarding public health that, at the present time confront dentistry and medicine, and really confront the nation.

Are we as a profession, working on preventable diseases? Is dental caries preventable? Is pyorrhea alveolaris preventable? Are deformities caused by malocclusion preventable? Personally I believe that most of you who have studied this subject from the standpoint of prevention will agree with me that they are. Why are dental caries and pyorrhea alveolaris now considered maladies? Why should we concern ourselves beyond the point of merely perfecting a technic of restoration of lost tooth structure by means of fillings, gold or porcelain inlays, crowns, bridges, partial or full dentures? Simply because the condition of the human mouth has become a serious health problem of both the dental and medical professions; because pulpless teeth and pyorrhea alveolaris are, according to no less authority than Dr. Charles Mayo, causing more systemic infection than any other factor that can be named. Dr. Mayo has stated that the majority of systemic infections originate above the collar, which means from the tonsils, nares and teeth. And, further, he places the teeth above all other factors as producing the greatest number of these infections.

Recently, in looking over a survey by Dr. Louis I. Dublin, giving statistics for the Metropolitan and New York Life Insurance Companies, I found the following: "Under twenty-five years of age organic heart disease causes as many deaths as typhoid fever; between twenty-five and thirty-four years organic heart disease causes as many deaths as lobar pneumonia; between thirty-five and forty-four years organic heart disease causes more deaths than Bright's disease, and after forty-five years organic heart disease shows a higher death rate than any other cause."

The findings of our most noted research workers lead us to believe that the streptococci viridans are almost always present and are chiefly the exciting cause in most of the heart infections. Where do they come from? Apparently from diseased teeth. The bacteria gain access to the lymphatics through the infected investing tissues of the teeth. The work of Dr. Henry A. Cotton, Medical Director of the New Jersey State Hospital, has established the relation of oral infection to certain types of mental diseases. A noted eye specialist says that his records

*Stenographic report of a talk before the Indiana State Dental Association, May, 1921.

show that forty per cent. of eye infections are the result of primary tooth infection, while we are all familiar with the types of arthritis and rheumatic infections that are attributed to the same cause.

While the possibility of other systemic infections could be mentioned, the foregoing references are made to show that infections from teeth as the primary foci present the most serious menace to the public health—a menace which the medical profession is depending upon the dental profession to eradicate and to prevent.

Let me analyze the problem that confronts dentistry in this regard: It is really the prevention of the most prevalent disease known—dental caries, and dental caries is so universally present that school children at ten or twelve years of age average more than seven cavities per child. Consequently there are few young people who escape a pulp involvement in one or more teeth. Therefore it is the exception to find an adult over thirty years of age without pulpless teeth. I want to ask a question of this audience. How many of you over thirty years of age, know definitely from radiographic examination or other means that you have not a single non-vital tooth? Will you please raise your hands? Out of this large audience I see fifteen. That is a fair average, and you can readily see the percentage of pulpless teeth which exists as a result of dental caries.

What is the cause of dental caries? Miller proved, over twenty-five years ago, that the exciting cause was the action of micro-organisms on starches and sugars, reducing them to lactic acid, which is the disorganizing agent. If there were no other consideration aside from this exciting cause, the control of dental caries would be but a matter of extreme cleanliness of the tooth surfaces and would not be such a serious menace. But cleanliness alone is not the answer. I believe it to be now generally accepted that the two great factors are diet and cleanliness. It has been frequently proven, in private practice, that 70 to 90 per cent. of dental caries can be prevented by intensive prophylaxis and rigid mouth cleanliness; but, on the other hand, I have examined the mouth of scores of Italian draftees who never had used a tooth brush, whose teeth were covered with plaques and fermenting starchy foods, but who had no sign of dental caries. In other words, with an entire lack of any system of mouth cleanliness, the *diet* was such as to maintain immunity to caries.

Animals do not have dental decay providing they are allowed to eat food of their own choosing. How is it we find the Esquimo, the African Negro, the peasants of Europe who live in the farming districts, the South Sea Islanders, the Maoris of New Zealand with no dental caries? While in Honolulu I had the opportunity of examining skulls of Hawaiians that were over one hundred years old, the teeth of which showed a very high immunity to dental caries. A survey had just been made of the teeth of the children in the fifth grade in the schools of Honolulu and these showed an average of six cavities plus per child.

The most marked change that can be found in the lives of these children compared with their ancestors is that of diet, especially in the use of our refined foods.

It is the history of tribes and nations where dental caries is the great exception and not the rule, that the diet consists of unrefined foods, while the peoples in whom dental caries is most prevalent are consumers of refined foods, such as white flour and white sugar. In addition to the local factors conducive to dental caries as produced by the fermentation of white flour and white sugar in the mouth, the possibility of the constitutional influences of such a diet was clearly shown by the experiments of Dr. Russell T. Bunting. He proved that a saline solution would pass through the enamel of a tooth from without inward, and from within outward through osmotic forces. This showed conclusively that the enamel is a permeable tissue, and opened up to us many possibilities of constitutional influences in combination with the local factors producing dental caries. If, according to the laws of osmotic pressure, salts from the blood and saliva pass readily through the tooth structure, is it not possible that there could be an interchange of other constituents of the blood and saliva that would also help to establish immunity or susceptibility? Might not the lactic acid formed by fermentation processes on the surface of the tooth be attracted by some constituent of the body juices in the tooth, possibly a like-product of fermented glucose absorbed from the intestinal tract? Such an attraction would encourage the penetration of lactic acid through the enamel, producing the initial stage of dental decay. If such were the case we could account for the fact that many unclean mouths, like those of the Italian draftees, are wholly immune in spite of the presence of bacterial plaques on the teeth, while seemingly clean mouths are vigorously attacked by dental caries. In the former case the refined carbohydrate consumption might be so limited as to produce no abnormal product in the blood and body juices and the constitutional factor would thus be lacking, while in the latter case it would be just the reverse. It would be exceedingly helpful if a physiological chemist could show whether or not susceptibility or immunity is in direct relationship to the acid salt concentration in the blood and the lactic acid on the tooth surface, in accordance with the laws of osmotic pressure through a permeable tissue. Kirk made reference to the possible relation of the constitutional effects of an excessive carbohydrate diet to caries susceptibility, and showed from microscopic investigations that in deep dental caries where micro-organisms have penetrated so far into the tubules that there is room for only a single micrococcus, this organism seems to get sufficient glucose from the juices surrounding the fibrils and poured into the tubules by the blood, to produce lactic acid and permit of the disorganization of the tooth substance to go on. Is the blood of susceptibles carrying an undue amount of glucose?

There is much in physiological chemistry that cannot be demonstrated in the laboratory, and extensive clinical evidence must necessarily be given serious consideration. Personally I am of the opinion that clinical evidence points *directly* to a *dietary of refined foods* as the local and constitutional cause of dental caries, and I believe further that children who follow a diet of unrefined foods are immune to this malady. My observations in public school work verify this belief.

In the attempt to prevent dental caries a faulty diet is most difficult to overcome even in the event that extreme cleanliness of the mouth can be maintained. The greatest factor for sound tooth structure and density of texture is a *correct diet during the prenatal period and in early childhood*, and I wish to call your attention to the fact that under the present conditions of prenatal and childhood feeding, the wonder is not that all children are afflicted with decayed teeth, but that they have any teeth at all. It is hardly necessary to mention to this gathering of professional people that the most important single substance for the growth of bones and teeth is calcium phosphate, or that the amount of calcium available for tooth formation regulates whether the enamel be hard and dense or relatively soft and porous. In addition to calcium salts there are other mineral elements needed—at least twelve being required for body uses. During the prenatal period and early infancy this high calcium requirement must be supplied by the mother, and unless there is an abundance of mineral salts in her diet, her teeth and skeleton may be robbed to supply the child. Aside from milk which is rich in mineral salts, the whole grains and most vegetables contain many if not all of the twelve mineral elements, showing the wonderful provision of nature in designing the vegetable cell to meet the requirements of the animal cell.

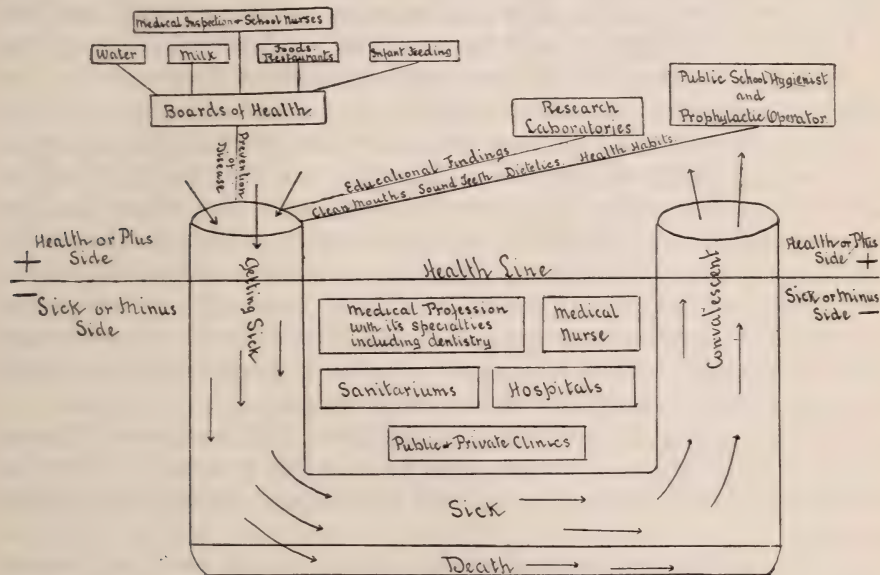
Man in his ignorance and greed, has deliberately perverted the food supplied by nature and submits it to a refining process which robs the food of its most essential elements and destroys its chemical balance. How can the body secure its twelve mineral elements essential for growth or how can good teeth be built when all of our cereal food, such as wheat, rice, corn and oats are subjected to a refining process and robbed of more than three-quarters of these mineral salts? How can the body secure its twelve essential mineral elements when our vegetables are first peeled and then boiled in water which extracts the juices and mineral salts and which is invariably poured down the sink? Some one has remarked that if the drain pipe had a digestive apparatus it would be perfectly nourished, for it gets the real meal, while the family gets the refuse. There is no doubt in my mind, that in refined cereals and refined sugar, in addition to ignorance in the preparation and cooking of vegetables, lies the *cause*, not only of dental caries, but of many other physical defects. At any rate, these are the dietary handicaps under which the body of the growing child is laboring to produce a perfect building from imperfect material.

Suppose we had to build a house. We would have in mind an ideal house—one with a concrete foundation, strong brick walls, slate roof, good plate glass windows and the finest woodwork and plumbing. As we proceed with the foundation we find the cement giving out, and are forced to add more sand to the mixture even though it will weaken the structure. When the walls are half up, the brick gives out and we have to substitute something a little cheaper, and so on with all the other materials until, in the end, although we have built a house which may look all right and which may last perhaps for forty years, yet we know that the right materials for our ideal house are lacking. So it is with the child's body. The cells, with their divine intelligence, have the ideal toward which they are building and which they would produce if given the right materials.

White bread which many have considered the staff of life has, through the refining of the wheat, been greatly demineralized and reduced to almost a pure starch with a little protein—a broken “staff of life.” The same thing is done with regard to sugar cane. If sugar could be crushed out with molasses, and all its juices and minerals left in, it would be a natural food, but these are removed to produce what we know as white sugar, its chemical balance has been destroyed, and it is reduced to a pure di-saccharid, in which state it can build no tissue and is of no value to the body except as a heat producer. In fact, it can be and is a menace when consumed in such quantities as one hundred pounds per person per year, which is what we average in this country in addition to the *normal* sugar supply found in milk, vegetables and fruit. Few people realize the amount of sugar that is utilized for cooking purposes alone in the average home, aside from the consumption of candy, ice cream, sodas, etc. The deleterious effect upon the teeth is well known, whereas I doubt if the teeth are harmed by unrefined sweets, such as honey.

Besides the absence of many of the essential mineral elements in our refined and “foodless” foods, they are, without exception, soft and pappy. The coarseness has been removed so as to require little or no mastication, with the result that malocclusion is as prevalent as dental caries. Lack of function and imperfect nutrition of the dental tissues in childhood produce malocclusion and, continued into adult life, predispose to pyorrhea alveolaris, and the entire circle of dental diseases is produced by that one factor—*diet*. The dentist must be an authority on dietetics, for it is the foundation of dental disease. For years the nutrition research workers have been making studies of foods in terms of proteins, carbohydrates, fat soluble A, water soluble B and C and calories, which is valuable to the scientist but beyond the comprehension of the mass of people who must be educated in dietetics. But there is a book called “The Science of Eating,” by Alfred W. McCann, that is simply and logically presented and within the comprehension of the general public.

The great field of prevention in medicine and dentistry has hardly been scratched. We dentists must admit that we are working entirely upon preventable diseases—preventable by two measures, *correct diet and cleanliness*, and yet the efforts of 46,000 dentists have been concentrated, not upon the prevention, but upon the cure. The same condition exists in the medical profession. I will attempt to show diagrammatically how little is being done to keep people well in comparison to curative efforts.



If the diagram of the Sick Tube is carefully studied it will be noted that those who enter this tube come from the Health area, passing through the tube to the convalescent stage where they again emerge into the Health area. Those who strike the bottom of the tube die. Working upon the minus side of the Health line on those who have become sick, chiefly from preventable diseases, are the medical profession with all its specialties including dentistry, the great corps of medical nurses, the sanitariums and hospitals, and the public and private clinics. Hundreds of millions of dollars are being expended for the cure of disease. What is being done on the plus side of the Health line to keep the people in the health area and prevent their getting into the sick tube at all? The boards of health have, especially in the larger communities, established departments for the inspection of drinking water, milk, foods, restaurants, and educational clinics for infant feeding and in the schools, medical inspection and medical nurses for the control of communicable diseases. There are also the research laboratories for discovering the causes of various diseases. These findings are of inestimable value for educational purposes or prevention, but what is so badly needed is a trained worker and educator in our public school

systems to establish clean mouths and sound teeth for the children, and teach dietetics and health habits. Here is a tremendous field that the Boards of Health do not touch, one where physical defects can be eliminated or prevented in early childhood and the coming generation taught to properly care for and feed their bodies. Every dollar spent for prevention on the plus side of the Health line means a saving of fifty dollars spent on the minus side, to say nothing of the continuance of the efficiency and happiness of the individual. It is not my intention in any way to belittle the efforts being made on the curative side, nor do I think such efforts should be decreased. The vital point is that we have not commenced to cover the possibilities of prevention, especially if concentrated on the children in our public school systems.

I want to ask what *you* are doing for the prevention of systemic infections among these people who are going into the tube? What you *can* do, if you are willing to endorse the preventive movement that has been adopted in several other states, is to place on the plus side of the Health line the dental hygienist—an educator and trained health worker. She is the main channel through which the knowledge of prevention that the dental profession has acquired is to be disseminated. Dentistry needs thousands of these educators in order to discharge her responsibility for mouth health to a public sorely in need of such service.

With the almost hopeless mouth conditions that now prevail among the adult population, the most fruitful field for prevention is in the work with young children who can be reached through the public schools.

From a public health standpoint, dentistry could render no greater service to the people than to place the dental hygienist in every school in the country. The response of the children to her teaching and prophylactic work is three-fold greater than that which could be expected in private practice. This deduction comes from several years of observation, and I feel confident that it will be accepted by all those who have had experience and who have given the matter serious consideration. This does not mean that adults should not have access to this education and form of treatment, but it does mean that the greatest impression can be exerted on the greatest numbers when concentrated upon the public school children.

When it is considered that general health as well as dental health is based on three fundamentals, it is not hard to realize what a tremendous factor for national health the public school hygienist can be. The three fundamentals upon which the preservation of health and the prevention of disease are based are, *one*, foods—the most important of all; *two*, mouth cleanliness with all that it implies; *three*, the health habits, which include posture, fresh air, body cleanliness, with special emphasis upon clean hands and the keeping of the fingers out of the mouth, exercise, thorough mastication, sleep, the use of the handkerchief in sneezing and coughing, mental poise, and in fact all those fac-

tors that are conducive to maintaining a high state of resistance and to preventing the spreading of communicable diseases. Fortunately it does not require an abundance of detailed knowledge to teach food habits or personal hygiene, for the public is not concerned over the details of science. Neither does it require a graduate dentist to teach mouth brushing or to give prophylactic treatments of the teeth.

Personally I believe that the public school hygienist should be in the schools on the same basis as the school teacher, except that she will specialize on the child's body instead of his mind. In this event, the most practical method of supplying the demand for this type of hygienist would be to train her in state training schools for teachers, that is, under the State Board of Education. I am working to establish a department of public school hygienists in connection with one of the Normal schools in Connecticut, and if the plan materializes, the state will finance the entire course, in return for which the graduate hygienist will be obliged to serve two years in public school work. I do not believe that the private practitioner should be denied the services of this co-worker for mouth hygiene, for she has an important field in correcting the uncleanness of adult mouths and in educating adults for the prevention of further disease. We must face the fact that the majority of dentists have failed to secure clean mouths, sound teeth and healthy gums, even for those patients who have had access to high grade private dental service. It is with no spirit of criticism that this statement is made, for there is not a sufficient number of operators to care for more than one-fifth of the people in this country. The average practitioner is not even able to cope with the operative work that requires so much time and skill, and to such a dentist it is an inspiration when his patients present mouths that have been made pink and white under the care of the hygienist. Further, it makes an enthusiast of the patient to whom the joy of a clean mouth is seldom known. This type of preventive dentistry is most necessary for the great mass of working people who need sound teeth for good health, but for whom operative dentistry is a luxury. There should be provision made for these people to secure preventive dentistry and education in mouth health through public infirmaries and industrial clinics in connection with factories or other private corporations.

I want to take this opportunity of warning against a growing impression that the dental hygienist is to be utilized as a nurse to assist the dentists and oral surgeons in operating. There is no analogy between a nurse who works with disease and a hygienist whose field is to preserve health and prevent disease. There is no surer way of defeating the efforts of your profession to control and prevent dental diseases than to divert this worker into assisting you with your operations upon dental diseases. It is because dentistry has concentrated upon disease which already was present that we find ourselves in such a hopeless position regarding prevention.

The dentists of Indiana must make it possible for the people of this state to secure preventive dentistry and mouth hygiene. There are about eighteen states that have made legal provision for the dental hygienist. She is firmly established, the demand for her services in these states is far greater than the supply, and nothing can stop this educational and preventive movement. It is simply a matter of guiding it into channels that will bring the greatest results in the prevention of mouth diseases. This movement is larger than an individual matter. No man or group of men, no one state means anything in comparison to the good of the mass of the people as a whole. I cannot believe that there are any in this audience so small as to fear that this movement will take away his livelihood. You, your children or your grand children never will see the time when dental caries is extinct. There are eighty millions of people in this country who need dental service, and you are able to care for so few of them. Dentistry was not created for your good or your gain; it was created for the good of the great mass of people, and no dentist can afford not to give his aid in every possible way to any movement that will better pernicious mouth conditions.

If you take a lantern into the woods the centipedes will see the light and run away from it, while the moths will fly towards it. As far as the moth can see the light he flies to it. I wish that all of us could be like the moth and travel toward the light, and not, like the centipede, run away from it. The light toward which we must travel is the light of education and prevention. If you believe that this educational and preventive movement is worth while, why not put your shoulder to the wheel and help keep it moving?

THE man who tries to make a "business" of a profession, is sure to fail both financially and professionally.

TRIGEMINAL NEURALGIA*

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IT IS A FACT WELL KNOWN to those called on to treat trigeminal neuralgia that, although deep and peripheral nerve alcoholization and peripheral neurectomies are productive of relief, the pain invariably returns in the average period of about a year. When these regions are again dealt with, each subsequent period of relief becomes of shorter duration and less profound, until such stage is arrived at as to afford no relief whatsoever.

The purpose of this paper is to establish two paramount points:

One. I have discovered that the buccal branch of the inferior maxillary division, though affected very often, is hardly ever diagnosed, and different from the supra-orbital, infra-orbital and mandibular branches, the "trigger zone" is vague and may sometimes give the impression that the neighboring nerves are the affected ones. For want of better language I have named this phenomenon a "mirrored trigger zone."

Two. Deep alcohol injections are more difficult and less certain, even in the hands of experts, than are well placed peripheral injections. Patrick,¹ who has had as large an experience as any in this country, admits in his report on 150 patients that he failed entirely in 26 per cent. of cases, was "partially successful" in 43 per cent. and absolutely successful in only 30 per cent. To this should be added that alarming sequelæ have followed this procedure. Patrick, Cushing² and others have reported quite a few complications of a grave order following deep alcoholization.

INJECTION OF THE BUCCAL NERVE

Aside from Blair's³ mentioning the buccal injection, I have never encountered, in the voluminous literature on the subject of trigeminal neuralgia, the buccal as a branch capable of becoming affected. It was more by accident than ratiocination that it dawned on me that this nerve "mirrored" itself in adjacent tissues, not only as a trigger zone, but even as to the sharp paroxysmal pains. When the buccal nerve is affected the patients may complain of the auriculotemporal, the infra-orbital or the mandibular region. The reason becomes clear, once the reader recalls the course and distribution of the buccal nerve.

*Read June 1921 before the American Medical Association Section on Stomatology of which, by special arrangement, THE DENTAL SUMMARY in the representative organ for the dental profession.

¹Patrick, H. T.: The Technic and Results of Deep Injections of Alcohol for Trifacial Neuralgia, J. A. M. A. **58**: 155 (Jan. 20) 1912.

²Cushing, Harvey: The Role of Deep Alcohol Injections in the Treatment of Trigeminal Neuralgia, J. A. M. A. **75**: 441 (Aug. 14) 1920.

³Blair, V. P.: Surgery and Diseases of the Mouth and Jaws, St. Louis, C. V. Mosby Company.

Fig. 1 shows that the buccal nerve is given off at the anterior or motor root of the third division of the trigeminal nerve. The diameter of its trunk is almost equal to that of the lingual or mandibular nerve. Therefore, it is a nerve of appreciable size. Emerging between the two heads of the external pterygoid muscle, it passes forward on the inner surface of the tip of the coronoid process of the ascending ramus; then, coursing obliquely downward and forward, it pierces the posterior fibers of the buccinator

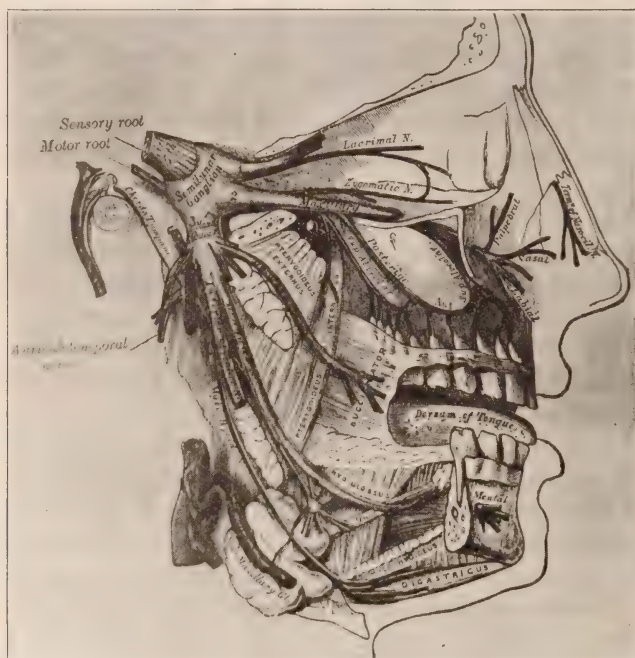


Fig. 1—The buccal (buccinator) nerve is to be seen as the first and highest branch of the third division.

muscle, ramifying its substance. Here, in my opinion, is the probable explanation of the mirroring: The buccinator muscle decussates at the corner of the mouth so that the lower central fibers pass into the upper lip and the upper central fibers pass into the lower lip (*Fig. 2*). I am firmly convinced that this intersection of fibers is the cause of the mirroring, nor do I think that it is stretching a point so to construe it. Another peculiarity: The buccal nerve, though coming off of the motor root, is the only sensory branch supplying the buccinator muscle. Further, all the muscles of mastication are supplied with motor nerves from the above referred motor root of the fifth pair, except the buccinator, the buccinator receiving its motor supply from the facial or seventh pair of cranial nerves. Still further, the buccal nerve not only gives off a deep temporal branch but, as I have shown by dissection, may give off superficial temporal branches.

The buccal nerve, being surrounded by and occupying the middle ground of the other sensory branches, lends itself to stimulation on the slightest provocation. Thus, because of its course as it is given off from the anterior root of the inferior maxillary division, it is easily disturbed by the mere opening of the mouth. Talking, eating or sipping brings the buccinator muscle into play, and this is sufficient to bring on a paroxysm. Touching the cheek from within or without the mouth, shaving, washing

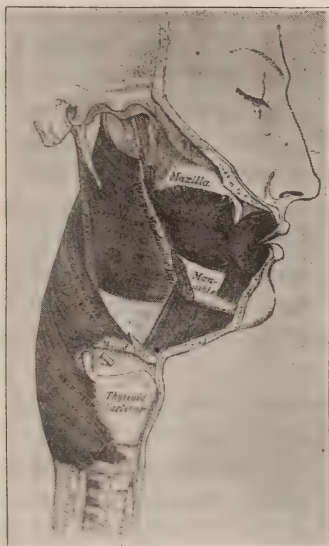


Fig. 2

Fig. 2—The intersection of the buccinator fibers can be seen at the corner of the mouth.

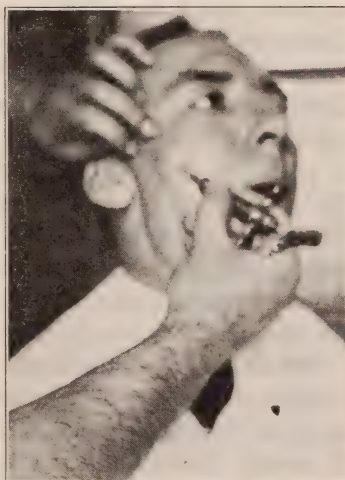


Fig. 3

Fig. 3—Technic for extra-oral buccal injection.

or wiping the cheek is sure to start a paroxysm. To make the diagnosis more obscure, the buccal nerve will "mirror" itself so that to the operator it appears to be definitely this or that branch. Usually he is almost certain that either the infra-orbital or the mandibular is the affected branch. I know that my readers, like myself, have reoperated or rejected a certain area time after time until the patient was, like ourselves, discouraged and exhausted. The pain not only persisted but became accentuated in its severity. These patients were, if operated on by capable neurosurgeons, finally relieved by intracranial operations. At this time I wish to attest to the fact not only that intracranial neurectomies are effective but also that the operation is not so fraught with dangers as many suppose it to be. I have seen and known several people whose sensory root has been severed or gasserian ganglion removed, who were operated on by both Southern and Eastern surgeons and whose recoveries from the operation were as uneventful as, if not more so than from ordinary abdominal operations.

To return to our discussion: I have noticed that the buccal branch is rarely primarily affected. As a rule it becomes affected after the patient has gone through the gamut for a year or more. The lingual nerve is also given to mirroring itself in neighboring tissues. A single instance of several occurrences will suffice:

Mr. V., aged 55, had suffered with trigeminal neuralgia for over a year. To all appearances it seemed to be the right infra-orbital. Subjectively, he informed me that by touching the right upper second bicuspid with the tip of his tongue he would start the pain. In the belief that the right infra-orbital was the guilty one, it was injected; but the next day the patient returned with the same tooth complaint, although the entire distribution of the infra-orbital nerve was anesthetic. When I touched his tooth with finger or instrument no paroxysm was elicited, but when I touched (with my finger) the tip of his tongue a violent and agonizing pain resulted, but mirrored in the right upper jaw. The lingual was immediately injected, and the pain has not returned.

Whether or not my opinion is shared as to the frequency of the elusive buccal branch becoming affected, I would suggest a blocking of it in the recurring patient. It is a procedure incapable of doing harm, and the technic for blocking it is simplicity itself.

Since the buccal nerve is affected in nearly all cases that have gone for a year or more, either it should be injected at the tip of the inner surface of the coronoid process, or it can be blocked a centimeter below and behind the mouth of Stenson's duct. Both points are reached intra-orally. I have, however, devised an extra-oral method that I think is easier for the average to master. The patient widely opens his mouth and a gag is inserted on the unaffected side. He is then instructed to pucker his lips, at the same time drawing the upper lip downward, this attempt makes the coronoid process conspicuous both to palpation and to vision. The needle is then inserted through the cheek just beneath the most prominent portion of the zygomatic bone, and advanced backward to reach the inner surface of the tip of the coronoid process (*Fig. 3.*) One c.c. of alcohol I have found to be sufficient. It is certainly gratifying to see patients who have been entirely relieved in every instance in a series of fourteen cases. This statement can be vouched for by several local surgeons who have either seen the patients or have themselves made the injections. It is my opinion that injections made at the foramen ovale, although successful as far as the sensory root is concerned, may entirely miss the motor portion, and since the buccal is a branch of the latter, the patient may go unrelieved.

ADVANTAGE OF PERIPHERAL INJECTIONS

Not only is blocking of the maxillary branches at the foramen ovale and rotundum uncertain, but the period of relief is not longer than when peripheral measures are taken. The latter is, I am firmly convinced, because only the peripheral twigs are ever affected and, therefore, central injections, even when successful, are blocking superfluous branches. I arrive at the conclusion that only the peripheral branches are affected, first, because the

patient's trigger zone and proper peripheral treatment has never led us out of the following nerve distribution: supra-orbital, infra-orbital, the trochlears and mental branches and etc. Secondly, the paroxysms of pain are always located by the patient as peripheral, never deep. To be sure, there are cases of deep pains, such as otalgia and sphenopalatine (Sluder's) neuralgia; also neuralgia due to pulp stones, impacted teeth, exostosed teeth, intracranial tumors, etc.; but they do not have the characteristics of trigeminal neuralgia, and, therefore, are not germane to our discussion.

It is interesting to hear what success we have met in peripheral injections: Whether it is due to the small lumen of the 42 mm. needle making it easy to find and follow the infra-orbital canal, or whether it is due to the use of pure alcohol, rather than the diluted, I do not know; but I find the canal in 100 per cent. of cases, and my average patient is free from pain for over one year. For the last few months I have been adding a few drops of formaldehyd solution, believing that it will help as a tissue fixer. The supra-orbital and supratrochlear injections are equally as successful; but, in order to prolong the effect, 1 c.c. should be injected for each branch, and both branches should be injected as a matter of routine. The lingual can be seen at the base of the tongue and is easily injected with 1 c.c. of solution. If the lingual is to be injected in the pterygonmandibular fossa 2 c.c. of 95 per cent. alcohol is to be used. This injection is also 100 per cent. successful. This applies to the buccal as well. The auriculotemporal can be injected as it crosses the root of the zygoma. (This branch is rarely affected; the buccal, when affected, mirrors in this region as before explained.) A dull needle should be used for this injection so as not to penetrate the vessels in the vicinity. The mandibular branch is the only one that does not offer a 100 per cent. success, and for that reason we prefer to remove it intra-orally. The operation when done intra-orally not only obviates a scar but facilitates the removal of the incisive and, what is more important, the labial and mental twigs. Bear in mind that I am stressing twig avulsion as more important than trunk removal. I am not at present prepared to say, but it appears that recurrent tic douloureux is due as much, if not more, to anastomosis after avulsion or injection, than to regeneration. Needless to say that, prior to injection, 1 c. c. of 1.5 per cent. procain-epinephrin solution is injected in order to prevent pain. Some operators will not anesthetize locally or with a general anesthetic, claiming that the conscious patient is of help. My experience is that the patient can be injected objectively, and, therefore, I prefer a local or general anesthetic.

COMMENT

The etiology and pathology of trigeminal neuralgia are unknown. This statement applies to all that has ever been written on the subject. It includes (although I for several years believed the contrary) impacted teeth, abscessed teeth, teeth with pulp stones and teeth whose roots press on nerve trunks. Exostosed roots, jagged alveoli following extractions—in short, no dental disturbances are capable of producing a single case of

trigeminal neuralgia. I wish that every dentist and physician that first meets the patient afflicted with this tormenting disease, with the unmistakable symptoms accompanying it, would bear this in mind. If they could only realize that the installment plan of extracting the patient's teeth; that dieting, climate, roentgen rays and violet rays are worse than useless, the patient would be spared much suffering and expense. It is also well to bear in mind that, though an infected antrum or small cyst or

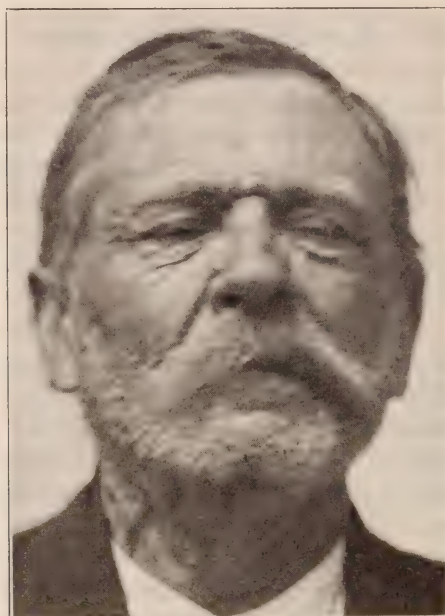


Fig. 4—Strained expression depicting utter agony. Picture taken during a paroxysm.

other condition be present along with tic douloureux, the clearing up of the antrum or other condition will not in the least influence this dreadful malady, as they are merely coincidental.

Let us briefly go over the symptoms: Whenever a patient presents himself with any or all of the following subjective or objective symptoms, he has one or more branches affected with trigeminal neuralgia:

The subject is usually of middle age or older; he complains of sharp lancinating or severe burning flashes that shoot through some area supplied by nerves above mentioned. If the subject has suffered for a year or more he may have a premonitory aura not unlike that found in epileptics. Whenever such aura is present the patient can sometimes ward off an attack. He is at times able to do so by simply remaining quiet. The alteration of facial expression accompanied by a ghastly stare is very characteristic in these cases. He will explain that a tooth or other structure in the distribution of the fifth, when touched, will yield this severe

paroxysmal pain. Talking or laughing is apt to bring it on. Washing, rubbing, shaving, powdering, or bedclothes stroking the area is sufficient to elicit the pain. In fact, a draft of air, the alighting of a fly, may cause a paroxysm. Oftentimes the affected area is caked with dirt because the toilet is carefully omitted in the affected zone.

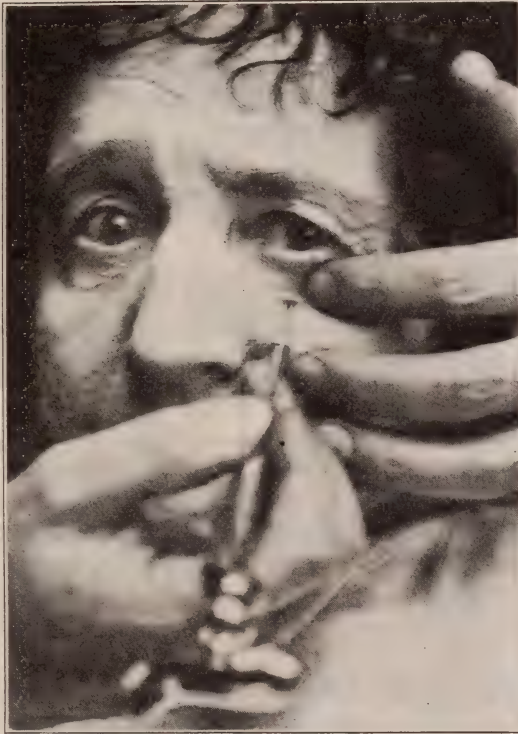


Fig. 5—This patient, after having the right gasserian removed, developed neuralgia on the opposite side.

It seems that the recital of the characteristics of this malady could be endless and still comparatively few recognize it. And the suggestions for treatment that one meets would be ludicrous if deprived of their disastrous effects. Extraction of teeth is about the oldest of ineffective treatments, and, as Cushing observes, few maladies can vie with this in the number of suggested remedies. Snake venom has been seriously advocated Sir Arbuthnot Lane⁴ asserts that the removal of the colon has cured trigeminal neuralgia.

One characteristic that is paramount above all is that the patient will invariably state that the pain is the most excruciating of all pains. This includes any injury he has received; acute appendicitis, renal colic, or other pain.

⁴ Lane, Arbuthnor: Chronic Intestinal Stasis.

Figure 4 shows a case in which, after an intracranial operation, the patient had the opposite (right side) affected. As a bilateral gasserian was contraindicated, she was referred for injection. The injection was made into the infra-orbital foramen with relief from pain for two years. Recently she complained of pain and her buccal nerve was injected with the result of completely stopping her paroxysms. A crawling sensation, however, still persists.

CONCLUSIONS

First. Dental disorders do not cause trigeminal neuralgia, nor do cranial tumors. When either are present they are merely concomitants. The etiology is, unfortunately, unknown.

Second. Deep alcohol injections are entirely too uncertain and do not offer relief from pain for a period exceeding proper peripheral injections.

Third. Intracranial operations in the hands of the skilled are not as dangerous as reported, DaCosta⁵.

Fourth. Because of its course, the long buccal nerve encroaches upon both the second and third distributions. Furthermore, the decussation of the buccinator muscle into the orbicularis oris makes it possible for the mirrored trigger zone to assert itself.

Fourth National Bank Building.

HISTOPATHOLOGY OF APICAL REGION OF TEETH WITH PARTLY FILLED ROOT CANALS*

BY EDWARD H. HATTON, M.D., CHICAGO, ILL.

TEETH WITH ROOT CANALS partly filled because of failure to introduce the filling material down to the apical opening have never been carefully studied by histologic methods,¹ nor is there any record of experimental work of this kind done on animals. This study is concerned, however, with human teeth extracted for the most part because of disease, of either the peridental or the apical region. Such material from the clinics of the Northwestern University Dental School was chosen for a preliminary study because of its availability and because no other human material was to be had with histories and roentgenograms. It is undoubtedly true that the conditions present in such material are not average and that the regenerative and reconstructive changes are close to the possible minimum, for in every case they represent clinical failures. This must be considered in any interpretation of the following results.

*Read June, 1921, before the American Medical Association Section on Stomatology of which, by special arrangement, THE DENTAL SUMMARY is the representative organ for the dental profession.

¹Davis, in a paper read before the Institute of Dental Teachers at Indianapolis in January, 1921, described a series of studies made by him on teeth with partly filled root canals. He thought that with mechanical removal of part of the pulp, so-called "surgical amputation of the pulp," the apical portion of the canal became filled with a solid core of "bone." His preparations were all made by grinding, and were dry and unstained.

It was early found in our work that, to handle any considerable number of teeth, the conservative, well tried histologic methods were too time-consuming. On this account, after considerable experiment, the frozen section method was chosen. Decalcification was carried out in 5 per cent. nitric acid, which contained 40 c.c. of solution of formaldehyd to each liter, and daily changes of the solution were made. At the end of two days the teeth were cut into blocks suitable for sectioning, and the decalcification was continued for one to two days longer. The short time employed yielded much more clearly stained preparations. For the structure of the pulp and peridental membrane nothing gave more uniformly good results than hematoxylin and eosin, but afforded no differentiation of the hard structures. In our hands the Schmorl thionin-picric acid stain furnished precisely this differentiation. By using these stains in alternation it was possible to study the relationship of all the soft and calcified structures. Contrary to our expectations, the sections held together surprisingly well, and so far no embedding method has been used, although the serviceability of the Sahlkind² cherry gum method has suggested itself. Where desirable serial sections can be cut by this method, though somewhat thicker than those cut without any effort to keep the order intact. Formaldehyd fixation has been most satisfactory, although the Zenker fixation yielded better stained sections with hematoxylin and eosin and the various coal tar dyes used especially for bacteria. The long fixation as proposed by Skillen³ has been used in a few cases, and it is worth noting that the picture of the hard structures in the apical region obtained by it and by the Schmorl method are essentially the same though varying in some of the minute details.

The largest single group of like changes occurring in the apical regions of these teeth with partly filled root canals are those found in the presence of infection, most of which are classified as chronic alveolar abscesses. Destructive changes are the rule, and the layer or layers of cementum covering the root end are quite narrow, though hypercementosis is often present, and in so characteristic a location as to seem to be a part of the change.

The unfilled portion of the pulp canal is either empty or contains an unorganized mass of the cells characteristic of low grade infection, or a formless mass of necrotic tissue. Where cellular structures are present, they are often embedded in a fibrous network best developed close to the wall of the pulp chamber, and continuous with a similar fibrous layer covering the end of the root in the place of the peridental membrane. At that part of the circumference of the root where the capsule of the chronic abscess, if present, is attached to the peridental membrane and the cementum, these two sets of fibers become fused, *i. e.*, those of the abscess capsule and these which have just been described. This junction point is important, for it is here, if anywhere, that the thickening of the cementum is noteworthy.

²Sahlkind, J.: *Compt. rend. Soc. de. biol.* **89**; 811, 1916

³Skillen: *Dental Cosmos*, June, 1920.

This connective tissue layer and framework adjacent to the wall of the pulp chamber and the cementum of the root tip is most important, for in its meshes are harbored blood-vessels, osteoblasts, and other cells engaged in absorption of both the cementum and the dentin of the root end. So far absorption has not been found in these studies except under these conditions, that is, the presence of osteoclasts and connective tissue cells. One cannot help being impressed with the fact that large numbers of various pathologic wandering cells are often found in the meshes of the alveolar abscess just on the other side of the organized covering of the root end. This type of abscess corresponds rather closely to one of the two described by Gilmer.⁴ In the second type neither absorption nor regeneration of soft or hard tissues occurs except under conditions like the foregoing or in the presence of an intact or partly intact peridental membrane.



Fig. 1—Apical opening of a tooth with a partly filled root canal, containing atypical pulp tissue. There is no evidence of any active process, either absorption of the root or regeneration.

The opposite extreme is found in root ends in which the apical portion of the pulp canal contains a more or less intact pulp, with vessels, nerve filaments, typical pulp cells and occasionally typical odontoblasts. The planes of contact of this pulp with the filling material are marked either by a layer of fibrous tissue or a layer of calcified material, and this calcified material may be amorphous, or may resemble secondary dentin, or more frequently cementum. Such pulp tissue lies in canals greatly narrowed by symmetrical or asymmetrical deposits of secondary dentin, cementum or

⁴Gilmer: *Proc. Inst. Med. Chicago* 3: 118, 1921.

amorphous calcium deposits. All the spaces unoccupied by hard tissues and filling material are occupied by such pulp tissue. It seems apparent that some of the hard material in and about the pulp chamber has been deposited since the filling, but much of the narrowing of the lumen goes back to a much earlier period (*Fig. 1*).

Closely akin to this are these apical pulp chambers that contain soft structures more or less undifferentiated. In some of these teeth this pseudopulp extends up to the apical end of the filling material and others not so far, leaving, apparently, a more or less empty space between. Some of the pictures of such teeth are striking; the ancient, irregularly round erosions into the dentin still distinguishable but now filled by cementum or some similar substance exactly molded into the cavities formed by the ancient absorption. There is evidence of the presence of still active



Fig. 2—High power field from the wall of the root canal of the apical portion of a partly filled tooth. The eroded border of the old wall is now filled by cementum, which has greatly reduced the diameter of the pulp chamber now occupied by an atypical pulp.

cementoblasts in this pseudopulp with the embedding of their fibers into the newly formed calcified hard tissues lining the pulp chamber. In other teeth this soft tissue lies within a pulp cavity which is but little changed either by absorption or by deposits of hard substance. This pseudopulp tissue is vascular, and consists of a more or less fibrous network in the meshes of which close to the pulp wall are found cementoblasts (*Fig. 2*).

The complete or nearly complete closure of the unfilled apical portion of the pulp canal by hard structures is found in a number of cases. There is nothing remarkable about such a closure; it is merely the end result of the

changes already described. In the smaller accessory foramina such a closure seems to be the rule, but it is much rarer in the larger, principal canals. In teeth with living pulps, such closures of the smaller foramina have frequently been found; so, no doubt, many of these seen in teeth with partly filled pulp canals were closed before the fillings were inserted. The structure of this plug of calcified material more often resembles cementum rather than dentin, or it may be quite amorphous, or lamellated like the markings of a fossil orinoid. It is the rule that the cementum covering the roots of teeth in this group is unusually thick, and this thickness may attain a very noteworthy degree, though the peridental membrane seems to maintain its normal width, as long as infection is absent. Spherical concretions are occasionally found in it but never of any notable size (*Fig.3*)



Fig. 3—Two foramina of the apical region occupied by calcified cores. This bicuspid has fillings in both root canals and hard cores in all the apical openings.

In all of these apexes where constructive changes are in progress, the cementum is richly supplied with lacunae and an interlacing network of fibrils, and the mixed character of the junction of the cementum and dentin is very prominent, with occasional club-shaped terminations of the dentinal tubules in apparent connection with the spaces in the cementum. There is nothing to distinguish the structures of this portion of these teeth from those teeth with entirely intact pulps, when prepared and stained in the same way. The peridental membrane of all but the infected roots is everywhere normally attached to the cementum; it has an ample blood supply so that nutrition is sufficient.

Out of twenty-nine teeth examined there are apical foramina that are empty or that contain granulation tissue in nineteen; there are five apices with living pulps, four with undifferentiated cellular structures, and seven with foramina closed with calcified plugs. Evidently infection is the most serious accident that may happen to the apical region of a partly filled tooth. This is borne out by the fact that in each of two molar teeth with three roots all partly filled, one root of each contains a living pulp, two roots of one and one root of the other are the site of noteworthy chronic infections, and the multiple foramina of the third root of the latter are practically closed by hard cores.

The existence of living pulps in these apical canals can be explained only on the assumption either that a living pulp was not damaged beyond the end of the root filling, or that a living pulp, though badly mutilated or damaged by the process of filling and sterilizing the root canal, was able partly to regenerate itself through the activity of coils or groups of cells, perhaps attached to undamaged blood vessels.

It is possible and even probable that this sort of pulp tissue may be an extension from the peridental membrane of the apical region. This seems very likely in the group of atypical pulps. It may not be peridental membrane, but because it is a constructive tissue, repairing the erosions of previous absorptions, and because the hard tissue deposited by it is similar in all respects to the apical cementum, it seems reasonable to assume that it may have originated from the peridental membrane. However, in many respects the pulp of the apical portion of the tooth does not always react like that of the middle or coronal portions, and the fibrous tissue framework and the cementum producing cells may resist insult better than the odontoblasts, the pulp cells and the nerves. These atypical pulps may be the remnants of otherwise destroyed pulps.

Although the number of teeth examined is too small for generalizations, yet the clinical opinion that constructive changes do take place about the apices of many teeth with partly filled root canals seems to be justified. In the second place, the apical portions of many teeth with partly filled root canals, judged by the same standards as are usually applied to teeth with intact pulps, are living structures. In the third place, infection is the most serious hindrance to the regeneration of the apical region, or to the complete closure of the unfilled canal by calcified plugs. And in the fourth place, it should be suggested that uneven closure of the unfilled canal may be a serious matter. The opinion is advanced that purely local conditions are of more importance than general conditions, that regenerations are more apt to be successful in root canals in which the distance between the apical end of the filling material and the apex is not too great, and that the small lumen or the lumen with a wide apical opening tapering toward the filling is more likely to escape unfortunate complication.

PRESIDENT'S ADDRESS*

BY J. P. HENAHAN, D.D.S., CLEVELAND, OHIO

It is my great pleasure to welcome our members to this the 64th Annual Convention of the Northern Ohio Dental Association.

In behalf of the membership I extend a welcome also to all ethical dentists and physicians who may be our guests.

I wish at this time to express the thanks of the organization, as well as my personal thanks, to my fellow officers and the members of the executive committee for their untiring work of the past months in perfecting the detail of this convention.

Dr. J. V. Gentilly, chairman, has had charge of the arrangement of the program, Dr. J. W. Hartshorn, the publicity for the meeting and Dr. T. H. Terry the arrangement of exhibits. The secretary, Dr. George B. Smith, and the treasurer, Dr. T. E. Hill, also have by their conscientious attention to the duties connected with their offices helped materially in the perfection of arrangements.

I also thank the many members of committees, many of whom have contributed unsparingly of their time to assist in the perfection of important features.

It is my privilege also to express our appreciation and thanks to our many friends whose cooperation has done so much to add to the success of the meeting.

Our many essayists and clinicians, many of whom have made long journeys to give to dentistry, through this organization, the results of their study and experience—

We convey to each one of them our most sincere thanks.

The Association is very much indebted to President Thwing and the faculty of the Western Reserve Dental College for their hearty cooperation in extending to us the privilege of using their laboratories for Dr. Campbell's course in prosthetics.

The Ransom & Randolph Company have again, as in the past, shown their good will toward us by printing the artistic program, after the design submitted by your chairman of the program committee.

Every really successful large dental convention is attended by our friends the supply men and, as usual, they are here. Their exhibits are, in many cases, not only of great interest as a commercial display, but also of great scientific value. I know that I will be expressing the sentiment of our members when I say that we will attempt to cooperate fully with those who by their presence have contributed to the success of this meeting and we will evidence our spirit by giving an attentive

*Read before the Northern Ohio Dental Association, June, 1921.

examination to their displays and give them the preference of our patronage.

For many years we have been holding our yearly meetings in this house and we have been contented and have prospered and it is befitting that we should express our hearty thanks to the Hotel Statler Company of Cleveland, through the Manager, Mr. T. P. Cagwin, who is our most gracious host, and also to his able staff of assistants, for the very hospitable manner in which they have complied with our needs.

I have felt it an honor to have been permitted to serve this old association in various capacities for the last five years. It has been a pleasure to be associated with the men who, during that time, have been my fellow officers.

On the occasion of this completion of my service, I take the opportunity to caution the members that if the welfare of this Association is to be safeguarded and its progress insured, its guidance must be placed in the keeping of conscientious men whose object shall always be the advancement of the organization and dentistry, having no thought whatever of personal aggrandizement. If this object is to be assured the members must execute their duty in the selection of capable candidates for the various offices.

The N. O. D. A., as well as being one of the oldest dental societies in the country, is also reputed for its progressive policy. It has always aided in the advancement of the best thought relating to the development of scientific dentistry.

The aim of the officers always is to produce a program which shall present to the members the most advanced ideas of the day; being careful to exclude subjects which in any way simmer of faddishness.

In accordance with this policy, the essayists are always men of high repute and known as practical exponents of the subjects they present, as well as for their ability to present the subject in a manner which enables the dentist in search of knowledge to grasp it. They shall continue to execute this policy so long as they have the support and cooperation of the membership.

The scientific world is advancing rapidly today and the dental profession must be alert if it is to keep abreast of progress. The results of experimental and clinical research are at the command of those members of the profession who care to avail themselves of them, but the best method of giving these results to the profession, so that the great body shall benefit, is a problem which has not yet been solved.

The student graduating from the dental college today is in possession of all that is best in up-to-date dental education and benefited by the results of standard courses. The question is: How after graduation shall he be kept informed of advances which are being made?

Taking into consideration the problem of post-graduate instruction and the fact that today there exists but very few recognized institutions dedicated to that purpose, as well as the narrow scope of the subjects treated, it becomes the problem of the dental societies, either by themselves or in cooperation with the established dental colleges, to devise a workable method for post-graduate instruction of its members.

The claim of the past that dentistry is a 95 per cent. mechanical science is now untenable. Present-day therapeutics take into consideration the effect of dental and oral disease upon the general organism and with a realization of this we must consider the day of the mouth-mirror dentist as past; he is a relic of a bygone day, and the truly scientific dentist of the future must be a man with a practical and workable knowledge of physical diagnosis, based upon a foundation of the knowledge of pathology.

The day also is approaching when the scope of dental practice must broaden out. The dentist's whole time will not be spent inside the walls of his office nor will his services be confined to those in good health or those who are well enough to come to his office for service. In the future the dentist will be a visitor to the hospital ward and to the sick-bed in the home, working in full and efficient cooperation with the physician, giving the benefit of his special knowledge and experience in behalf of those suffering mortals whose ills in many cases are traceable to dental conditions which their ignorance and neglect have brought about.

The necessity for this service exists today and the question arises: Is the profession equal to the requirements? If the answer is "No" then what shall we do as a profession to improve the situation? Before this question can be satisfactorily answered much thinking must first be done and then much work.

For the N. O. D. A. I can answer that in accordance with our past policy, we will be ready to do our full part. Rome was not built in a day, but with patience and perseverance much can be accomplished.

THE PSYCHOLOGICAL LAW OF ANESTHESIA

BY BERNARD FELDMAN, D.D.S., PATERSON, N. J.

(Written for THE DENTAL SUMMARY)

(While not necessarily endorsing any of the deductions of the author of this series, the Editor and publishers believe that, in the interest of the advancement of science, the work of all sincere investigators is deserving of consideration by the largest possible group of intelligent men and women. It is in this spirit that space is devoted to these articles by Dr. Feldman, even though they may be considered by some as rather remotely related to dentistry.—G. E. H.)

(Continued from page 81 January DENTAL SUMMARY)

9

HUMAN CONSCIOUSNESS

We thus see that the "objective mind" is merely so-called, being that part of mind which functions through the physical brain, while the "subjective mind" is a distinct entity, possessing independent powers, and functions, having a mental organization of its own, and being capable of sustaining an existence, independent of the body. In other words, and broadly, *it is the soul's mechanism*. It is the seat of the emotions and the storehouse of memory.

It performs its highest functions when the objective senses are in abeyance; the more perfectly the functions of the brain are suspended, the more exalted are the manifestations of the subjective mind. The nearer the body approaches the condition of death, the stronger becomes the demonstrations of the soul. It possesses what is designated as clairvoyant power, and besides others, the ability to apprehend the thoughts of others without the aid of the ordinary means of communication.

The brain is but the instrument or organ of the objective mind and as a mere hulk of matter would be incapable, of itself, to move itself; the sympathetic nervous system is similarly but the instrument of the subjective mind. The whole wonderful arrangement must be controlled by an Intelligence, and we have called this divine spark of divine intelligence, the Higher Ego.

Another distinguishing feature between this *spiritual* attribute with which the Infinite Mind has endowed the human being, and his other *physical* functions, is that whereas the latter require rest and recuperation for the organs that manifest such physical action, the subjective mind, or the *human Soul*, *never sleeps*. This spiritual faculty or functioning of the soul comprises human self-consciousness. Sir William Hamilton described the condition called self-consciousness as "the knowledge that the 'I'—the Ego—exists in some determinate state." This retention of conscious individuality by the Soul is best illustrated as the powers of the Soul become increasingly manifested when the objective faculties are perfectly passive during normal sleep, abnormal sleep, (such as swoons, fits, catelepsy), or artificially-induced sleep.

While the hulk of matter which we call the physical body lies apparently inert, the Soul is constantly, consciously active, and stands guard over the vital life-processes. It partially relinquishes its vigilance only after the objective faculties are restored, and the body awakens from its natural or its induced slumber. This relinquishing is never complete, for the Soul is ever active while the body is asleep or wide awake. The Soul is the connecting link between man's physical body and its spiritual Creator.

The term "loss of consciousness," or "unconsciousness" is really a misnomer, inasmuch as there can be no total loss of the Individuality, except under conditions very unusual and not considered here. A better and more truthful expression would be "expansion of consciousness." It is an occult teaching which we cannot discuss at greater length at present, that we have an expanding consciousness. Seven states of consciousness can the Ego experience on this plane; there are similarly seven such states on the six other planes of existence, making a total of forty-nine states in which the Individuality can recognize itself as a distinct entity. By a series of progressive awakenings, there is an upward progress of the Ego, in which the spiritual senses of the Ego begin to function and the mind works perfectly at its duties while the Self remains at a loftier height. The Ego recognizes the spiritual life in all its fullness, being itself of spiritual essence. The language of its environment penetrates directly into the innermost sanctuary of the Ego, and it can master the secrets of sounds and colors that are inaccessible to the material plane. By attuning the body and mind until they are spiritually pure enough for the spiritual senses to catch such finer vibrations, the Ego is rendered conscious through *harmonious vibration* in these higher spiritual realms. Such an Ego expands through these forms of consciousness, until it comes finally to the All-Spirit, the Absolute Consciousness, the last and most sublime state of human consciousness, Oneness with all that is—Nirvana, (which means Union.)

Such realms are not necessarily beyond the stars, nor are they removed from us at any time by great spaces; but they may be interpenetrating mankind in every portion of its being.

It would be interesting but space forbids us to discuss this sublime Nirvanic doctrine; in spite of the malignity and misinterpretation to which it has been subjected, there is nothing mysterious in the absolute verity of the fact that Man possesses divine faculties which yearn to reach nearer and nearer to their Source, the Absolute Consciousness or Deity. Further, Man has the power to expand such faculties, if he will only awaken the higher centers, after having purified the physical vehicle. We have at almost every moment a fresh experience or manifestation in our lives which proves to us that the conscious Ego is one of the fractional aspects of this All-Spirit. And we have in dreamless sleep only another one of the seven states of human con-

sciousness, in each of which a different phase of the mind comes into action, and the individual is conscious on a different plane of his being.

The human consciousness is not tied down to the physical plane but stretches into greater worlds than this. We have ample proof that the Infinite Mind has provided the organism with the power to allow its consciousness to take temporary flights from its physical plane to higher spiritual planes. The most familiar example is normal sleep; in the stillness of the night hours when our bodily senses are fast locked in the fetters of sleep, and our bodies rest, other phases of our organism become free, and may travel around the visible as well as the invisible worlds.

How can complete surgical unconsciousness be explained, therefore, on physical or physico-chemical grounds (especially when no drugs at all are employed) without considering *primarily* the psychical and vital factors which have been enumerated?

10

LOSS OF PAIN IS A SUBJECTIVE CONDITION

We conclude therefore that ANY vital function of the body such as anesthesia is considered to be, must be traced to the action of *Mind*, that essence which emanates from the Supreme Being, and involves psychical factors which carry out His protective scheme to assure the safety and the preservation of *His* living cells.

We have recorded hundreds of cases of surgical operations performed under hypnotic anesthesia; we also can add other physical or outside means (such as extreme cold and prolonged pressure on nerve-terminals) which will also produce anesthesia *without the use of drugs*. Is it not reasonable to assume that all these means of inducing anesthesia are but several similar manifestations of the power with which Nature has endowed the human cell to assure its safety, especially when placed in danger? Anyone who is placed in a more or less pronounced subjective state of mind may lose some or all sensibility to pain, proving that loss of pain is a subjective condition. The soldier may be severely wounded on the field of battle, yet he is in such a pronounced subjective state of mind that he will often not feel the pain caused by the wound until he is out of danger. The football player may be badly hurt in an exciting game, a person may be engaged in a bitter fight for his life, or in some other dangerous situation which makes him oblivious to his surroundings or to any pain. Some people can, by using certain practices, bring about this subjective state, and authentic stories are published¹⁸ of savages who have so worked themselves into a condition of religious fervor in preparation for a sacred rite, that they were seen to pass through roaring flames unharmed. Certain clairvoyants have been seen to handle burning-hot coals with

¹⁸F. S. Hoffman, "Psychology and Common Life."

their bare hands. These are extreme cases to be sure, *but the subjective state is not so unusual or extreme. We all enter it when we go to sleep.* Normal sleep has been known to be so profound that a foot was burned to a cinder without the knowledge of the sleeper.¹⁴ (Guy Luys: "The Brain and its Functions").

We thus see that anesthesia is present in the cell organism, varying in degree of intensity according to the nature or means which are employed in inducing the subjective state of mind, in which one or more of the objective senses are held in abeyance. Chemicals are only *one* means at our disposal which we can employ in inducing it; but Nature has provided the cell with its own means and mechanism when the occasion arises.

11

A BRIEF RECAPITULATION

If the experiments of Svante Arrhenius are to mean anything to us, there is good reason to conclude that the chemical effects of the drugs which are employed in surgical anesthesia are secondary in their importance; the primarily important factor must be found in the structural or morphological change which may take place in the nerve cells under the stimulus of Mind, of which they have become highly specialized agents. We have shown how the nerve cells have been given special psychical powers which respond to the various forces of Nature which operate upon the physical organism.

All natural forces, physical and superphysical, emanate from the *primordial energy* of the Supreme Being. We will now attempt to go into greater detail in presenting the connecting mechanism in which these natural forces are enabled to operate in the human body.

We live in two media of nature, the physical (or cellular) and superphysical or the astral (or supra-cellular; *i.e.*, of finer substance—molecular, atomic, ionic, etc.) The latter is a realm of vast complexity, co-extensive with and quite as populous as the physical plane, and filled with as great a variety of natural phenomena.

It is necessary to know of these superphysical forces which effect the body, and particularly so when this body leaves its physical frame and the physical plane, and passes into the higher spiritual planes while it is unconscious. When the human being is released from its imprisonment of flesh, whether by the solemn process of nature which we call death, or by the more frequent manifestations which we know as ordinary or artificially induced sleep, upon quitting the physical the consciousness opens upon the astral plane. In order to understand and grasp the problems involving unconsciousness, we must possess the fundamental facts of occult (or hidden) science. It is absolutely necessary to learn the esoteric factors in order to understand the part

¹⁴Christison, "The Brain in Relation to Mind."

which the superphysical forces of nature play in our discussion of surgical unconsciousness.³³

After learning these facts, it will be a simpler matter to furnish the connecting mechanism in the human body. Briefly, this consists of the soul, the subconscious mind, and the nerve-cells of the body. We will now proceed to discuss the soul of man, because it is the seat of consciousness as we ordinarily view it. Later, we will discuss the neuron system of man, which is the last link in our complete chain. And finally we will bring them all together into one rational whole, which constitutes the mechanism which controls the phenomenon of anesthesia.

12

SCIENTIFIC PROOF OF THE EXISTENCE OF HUMAN AURA

In ancient times, Religion and Science agreed that Man was endowed with spiritual as well as physical attributes. Paul said that: "There is a natural body and there is a spiritual body" (I Corinthians 15). But modern science and modern religion are at loggerheads on all such problems. Having enunciated the spiritual part of Man's makeup, religion has been employing very poor means, for the last fifteen hundred years, to prove its contentions. The existence of Soul and Spirit has been denied and belittled by "exact science," which will affirm nothing that can not be analyzed and experimented upon with our five physical senses. This materialistic view point has become ingrained in all walks of life, and has saturated humanity to the point where spiritual concepts have little if any influence in the uplifting of humanity. However this position is slowly but surely being given up as facts are piling up day by day to prove the existence of that omnipotent and all-important thing we call Spirit. Science will some day acknowledge the occultists' claim that it is the *only* real and permanent thing in existence, from which all other things originate.

Some scientific progress has already been made in this direction. Reichenbach announced in 1845 that there was an imponderable influence emanated and developed by certain crystals, by magnets and by the human body; he claimed that it was associated with heat, chemical action and electricity, and he named this influence "odyl," or "odic force." The rays of light streaming from the ends of magnets *and the tips of human fingers*, were plainly discernible to his "sensitives" whom he had hypnotized and who were thus rendered more spiritually sensitive to such fine and invisible vibrations. Since then, innumerable people have claimed that they could see the human aura. They had trained their spiritual senses through a process of spiritual purification known in the East as Yoga; they were able to see this electrical and magnetic essence which emanates from the human body, forming an ethereal double or pattern of it. From the remotest times, clairvoyants

³³A. P. Sinnett, "The Rationale of Mesmerism."

and others who were endowed with psychic powers have claimed to see the human aura, but they were scoffed at and misbelieved.

In 1908, Walter J. Kilner, of London, removed all doubts of its existence, and science no longer doubts it but accepts the human aura as a proven fact. Kilner has made it visible to the naked human eye by looking at it through a screen of coal-tar dye called dicyanin. This screen is composed of two pieces of flat glass, separated by means of rubber, the space being filled with this dicyanin.

The human Aura is the man himself manifest at once on the four lower planes of consciousness; it is the aggregate of his four lower principles, of his vehicles of consciousness. In a phrase, it is the form aspect of the man. It is thus to be regarded and not as a mere ring or cloud surrounding him.

Chemical energy, being of the same spiritual essence, is more capable of tracing or sensitizing this invisible *human* principle, which is only the second of the seven principles of Man. *It takes spiritual senses to perceive spiritual forces*, and we will soon show that Man does possess these spiritual senses which link him with the Divine. Science can go little further in its analysis of Spirit or the finer spiritual attributes of man, if it will insist on using its clumsy physical instruments which necessarily fall short in catching such very fine vibrations.

13

THE ETHERIC DOUBLE*

We can fortunately perceive the human aura because it is coarse enough and material enough to be caught by our finer senses; yet it is too attenuated or ethereal to be perceived by the grosser physical senses. It is composed of matter which goes to form the astral body, and is electrical or magnetic in essence. It forms the link between Mind and Body. It is closely blended with the physical body, which it sustains and keep in shape. Aided by the life-principle which we have already described under Section 5 and which furnishes the energetic power, this etheric body keeps the life-forces in place and prevents them from producing monstrous and excessive growths. It furnishes the model-body or pattern, and the physical body grows from the embryo upwards according to the design of this model, just as the acorn contains within itself the oak tree which is modeled entirely in astral matter. To this seed are supplied the physical ingredients to enable it to grow and to bring forth into the physical world the physical tree from the already existing astral model. And so everything in the physical world exists beforehand in the astral world in plan.³⁸

It is in the astral body or etheric double that the *real* spiritual organs, the counterparts of the outer sense organs, are located. It also has nerves, arteries, etc., corresponding to those in physical man.

*The engravings of the aura were loaned by "SCIENCE AND INVENTION" for use in the publication of this article.—Editor.

³⁸Theosophical Manuals.

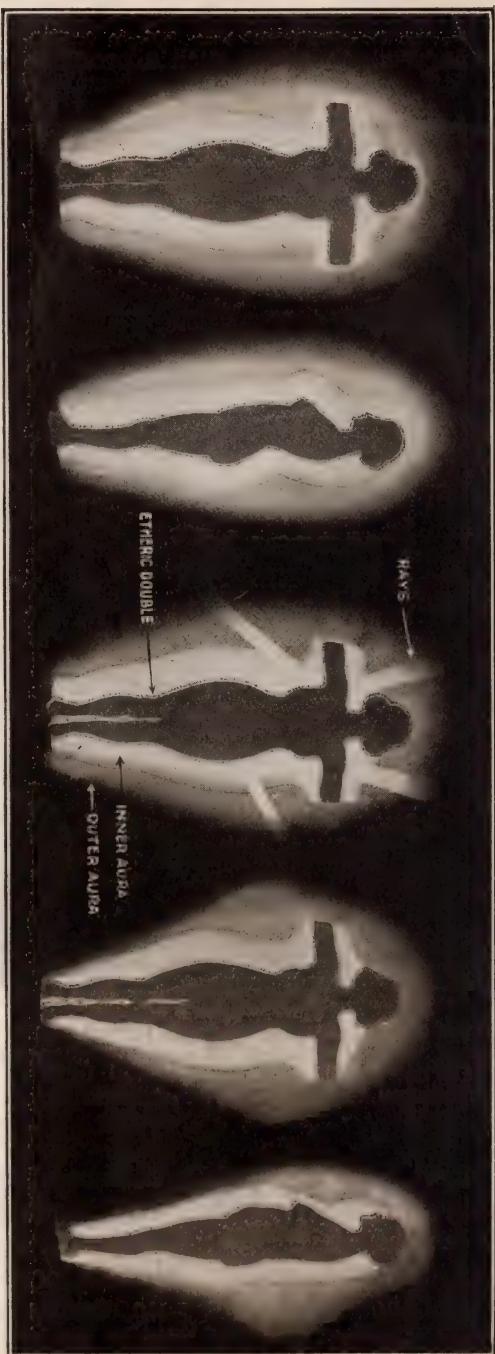
The physical eye, ear, and nerve papillæ contain only the outer mechanism of the senses, by which the impressions are conveyed to the double. In it are also stored up the subconscious perception and latent memory which afford such a problem to hypnotists.



The aura of a healthy strong man; the subject in this case was an athlete thirty-three years of age. The color of his aura was blue with a little gray. The etheric double will be noted lying close to the body. In this case it was very clearly defined. It measured about one-quarter of an inch broad. This aura was unusually coarse.

Col. Albert de Rochas, of Paris, succeeded in entirely disengaging or separating this etheric body from his subject's physical body, and gradually removed it to greater and greater distances until it stood several feet from the entranced physical organism. He then pricked the surface of the etheric body with needles, and the sleeping subject experienced these sensations of pain in her own physical body. Emile Boirac³¹ could make his subject, whom he entranced, read without

³¹Emile Boirac, "Our Hidden Forces."



Above: The aura of a healthy woman. This is a perfectly shaped aura of average width enveloping a young woman, 23 years old. The color was blue gray. This is a very fine specimen of aura. A diyanin screen is usually required to make the aura visible, but after becoming used to the effect many experts can see it without the screen.

This shows an aura of a healthy woman and also shows as well the rare phenomenon of "rays" breaking out from various parts of the body. These rays, however, are nonluminous. They are simply an emanation. The age of the subject was twenty-five years.

Health has a good deal to do with the aura. The above shows an aura of an hysterical woman. Note particularly the bulge at the back. Also note that the outer aura is wider in shape than normally. The subject was a young girl and rather emaciated. In this case the inner aura was striated.

the use of his physical eyes, and perform other duties by the use of the spiritual senses *which are the real senses of the human body*. Dr. Ochorowitz³⁸ asserts that his medium, Mlle. Tomcyk, can by an effort of will construct a psychic thread out of this astral matter, which is so strong that it can be heard scraping against solid objects and even *seen* occasionally—yet it does not exist as a physical reality for the space between the fingers and the object may be cut without severing the connection.³⁸ Emile Boirac also claims that this force can be *accumulated and then conducted through a metal wire or other suitable intermediary*; his friend Dr. Barety has gone even further than this: he has even measured the speed at which psychic force can travel. Conducted along a flax string, the magnetic rays or force covered a yard a second.³¹ Hereward Carrington³⁹ writes that the vital or nervous force or energy is sometimes powerful enough to be able to move physical objects *without contact*, and that it can be projected rapidly outwards to produce percussive sounds or taps.

The Astral body is not to be considered a Spiritual being; its consciousness is largely automatic and its cohesion breaks up soon after death in normal cases.

³⁹W. G. Crile, M. D., "Influence of Inhalation Anesthesia on the Acidity of the Blood."

(To be continued)

THE only advantage of "good birth" is this: It is easier for the man who is well-born to improve on the merits of his parents, than for the man of low birth and breeding to create new ones of his own.

PENETOLOGY

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This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

Having submitted an idea for consideration in the last issue of this publication, it is no more than proper that arguments and demonstrations setting forth the contentions that the idea submitted has merit or that it is perhaps superior to the common conception and application of the subject of penetology (X-ray), should follow; so here they are.

Perhaps one of the strongest reasons for the slowness of the appreciation of the benefits one can derive from a penetogram lies in the fact that so few are capable of teaching this subject, perhaps due to a lack of standardization in the work. This lack of standardization is no doubt due to the lack of foresight of the early workers in this field. To them it seemed that if a tooth were pictured with a properly filled root canal, that the skiagraph (penetogram) had fulfilled its maximum function and that the dentist had performed a most wonderful operation. The study of the penetogram at that time did not extend beyond the study of the tooth. Today our studies are unlimited in their scope. Of course our apparatus is so much improved that today a 12-second exposure is a rarity, while a 12-minute exposure in the early days was a necessity.

The manufacturer of X-ray apparatus has set a standard and each year that standard is elevated. This advancement is producing some wonderful apparatus. The profession has not kept pace with the manufacturer and his ability to produce machines which make perfect pictures and reproductions of the area exposed. Why the discrepancy?

The answer is in the fact that there is no standard idea on which to base a co-ordinate conception of what is portrayed in the X-ray picture, improperly termed a radiograph, perhaps more properly a penetogram.

In trying to define a dental radiograph, the author recently put the question to a number of well known professional men. The universal answer was that it is a shadow picture. There is nothing distinctive about this definition and nothing about it which might be considered as the basis of an argument because of a difference of opinion as to what is seen. It is truly a shadow picture, so is the picture produced by any object which obstructs light rays—a tree, a building or anything in the path of the light.

In the taking of a dental penetogram, light is directed at some dental area. The shadow cast is by the teeth, the alveolar process, the soft tissues, the fillings in the crown of the tooth or in the root canal, or all of them. Yet if this were a simple shadow picture, that shadow would be a monotoned, even and dark area. We find, however, that our pictures are not monotoned. They are mottled. This mottling is not an accident. It does not appear on a few pictures, but appears on all dental films.

What causes the mottling?

The tissues of the body obstruct ordinary light rays and form shadows. The shadows produced by a human body or a bare portion of bone are equally dense and equally dark and smooth. They are not mottled. The X-ray pictures produced on a dental film are distinctly mottled, and show the porous condition of alveolar bone. They do more than that, but that is something for future consideration.

Since the mottling of a dental penetogram does not depend particularly on the area which is being pictured for its appearance, we may look elsewhere for the reason. As a shadow picture, there can be no mental picture produced as to what is portrayed. Shadow pictures are smooth and even-toned outlines of light-obstructing bodies.

It may be contended that the X-ray pictures are made up of a number of shadows, one within the other. Who ever has heard of or seen a shadow produced by light, the power of which had been obstructed or obliterated by several impervious bodies? When such shadow is formed, it outlines the entire mass which obstructs light, not each individual mass with the area.

The solution of the question is not found in any definition based on the explanation of shadows and their formation, neither is it found as a peculiarity of the area being pictured. It is found, however, in the process of picturing and in an explanation of one of the properties of the light, or more properly speaking, the light rays which are used.

The portrayal by lens photography should not be confused with portrayal by penetography. This also will be taken up in detail later.

Outside of the optical rays of the spectrum there are to be found rays with a pronounced shorter wave length, all of which are in the chemically active group. These rays also have an added power, much of which is being investigated and exploited at present.

Treatment by the use of various lights, particularly the violet group, is an old practice as well as the treatment by light rays in general. It has been proven that the longer the wave length of the light used, the more superficial is the effect. The effect, if long enough continued, or the light if long enough active, will produce a burn of various degree and depth, dependent on the group of rays used. In a penetological burn (X-ray burn), and they are becoming less frequent of late, the burn is the result of the use of a ray of longer wave length, often termed secondary rays, than the length of rays desired.

Reference is now made to the chart below, reproduced from the September issue of THE DENTAL SUMMARY where wave lengths of light rays, and particularly the rays of the various colors of light, are given. It will be particularly noted from this chart that the rays of light above the optical spectrum or visible rays are longer rays and have a dominant property of heat production. Electricity and electric rays are included in this range. It is a well known fact that the *obstruction* of electric waves produces heat and fire and will cause a burn. The obstruction of the optical rays produces a shadow. What peculiar properties have the remainder of the rays of the solar spectrum?

Chart indicating wave length of light rays, also the predominant properties waves of various lengths possess.

Color of rays		Wave lengths		
Heat rays including electricity. Optical or visible rays.	Tri-ultra-red	Longer than	18	microns*
	Bi-ultra-red		18	mic.
	Ultra-red		8	mic.
	Red	Solar light rays	0.71	mic.
	Orange		0.66	mic.
	Yellow		0.62	mic.
	Green		0.53	mic.
	Blue		0.48	mic.
	Indigo		0.43	mic.
	Violet		0.38	mic.
	Ultra-Violet		0.21	mic.
	Bi-ultra-violet	Chemically active rays.	0.10	mic.
	Tri-ultra-violet		0.014	mic.
	Rays of radium and Roentgenography		0.014	mic.
		Finse light rays		
		Shorter than		

* A micron is equal to one millionth of a meter or one twenty-five thousand four hundredth of an inch in length.

Note: The shorter the wave length, the more rapid is the wave.

The property of the rays at the lower end of this chart, and the property most often made use of, is that of penetration. The short wave length and the rapidity of the impulse of these waves against an obstructing body apparently permits the impulse from them to pass beyond such a body. These rays do not seem to lose their chemical power, a power of all solar rays from red to radium and penetography (roentgenography). It is by virtue of this latter fact that a penetogram is produced. In all photographic work, the negative is produced through the chemical action of light, the reduction of salts of silver. The rays which penetrate an area or object retain this power.

This is not a complete explanation for the appearance of the mottled shadows in penetography. It is in part, however. In penetology the force of light rays on waves is carried beyond the area to be pictured.

It is delivered there in a definite measure of chemical force. This force is measured by the power of reducing the silver coating on the film and is governed by the obstructive power of the area pictured.

This leads us to the next question. What obstructs the peneto-ray?

Comprehensive tables of atomic weights of elements and a corresponding table indicating the relative density of most of the elements was published in the pamphlet mailed on request by the Victor X-ray Corporation in their August number of "Service Suggestions." Two of these tables are reproduced here.

Experience has proven that certain elements obstruct peneto-rays. Studying these elements it can be noted that they do not all obstruct peneto-rays equally. It is also noted that the ability of obstruction of any element is constant and in a definite ratio. This ratio is found to be in proportion to atomic weight and density.

It is hardly opportune to discuss the definite relation of atomic weights and density, but by reviewing the tables, a rather familiar sequence of relative penetration of light rays (peneto-ray) is to be noted.

Referring to table No. 1 with the elements given in numerical succession, it can be seen that the gases head the list. As the mineral salts are approached a greater atomic weight is developed which increases through-

ATOMIC WEIGHTS AND DENSITIES OF THE ELEMENTS

Element	Atomic Weight	Density	Element	Atomic Weight	Density	Element	Atomic Weight	Density
Al	27	2.70	He	4	0.178†	Rb	85	1.532
Sb	120	6.62	H	1	0.08987†	Ru	102	12.3
A	40	1.78†	In	115	7.12	Sa	150	7.8
As	75	5.73	I	127	4.95	Sc	44	—
Ba	137	3.75	Ir	193	22.41	Se	79	4.5
Be	9	1.93	Fe	56	7.86	Si	28	2.3
Bi	208	9.80	Kr	83	3.708†	Ag	108	10.5
B	11	2.5 ?	La	139	6.12	Na	23	0.971
Br	80	3.10	Pb	207	11.37	Sr	88	2.54
Cd	112	8.64	Li	7	0.534	S	32	2.07
Cs	133	1.87	Lu	175	—	Ta	181	16.6
Ca	40	1.55	Mg	24	1.74	Te	127	6.25
C	12	3.52	Mn	55	7.39	Tb	159	—
Diamond	12	3.52	Hg	201	13.56	Tl	204	11.9
Graphite		2.3	Mo	96	10.0	Th	232	11.3
Gascarb'n		1.9	Nd	144	6.96	Tm	168	—
Ce	140	6.92	Ne	20	0.9002†	Sn	119	7.29
Cl	35	3.23†	Ni	59	8.9	Ti	48	4.50
Cr	52	6.50	Nb	93	12.75	W	184	18.8
Co	59	8.6	N	14	1.2507†	U	238	18.7
Cu	64	8.93	Os	191	22.5	V	51	5.5
Dy	162	—	O	16	1.429†	Xe	130	5.851†
Er	168	4.77 ?	Pd	107	11.4	Yb	174	—
Eu	152	—	P	31	2.2	Y	89	3.8 ?
F	19	1.69†	Pt	195	21.5	Zn	65	7.1
Gd	157	—	K	39	0.862	Zr	91	4.15
Ga	70	5.95	Pr	141	6.48 †			
Ge	72	5.47	Ra	226	?	Paper	—	1.0
Au	197	19.32	Rh	103	12.44			

†Grms. per litre at 0° C. and 760 mm.

out the metals through silver, barium, gold and lead. In table No. 2 it will be seen that the atomic weight of elements does not necessarily mean their density. A comparison of the atomic weight and density of bismuth with that of gold shows that the bismuth is heavier than gold, while its density is less.

THE ELEMENTS IN THE ORDER OF ATOMIC NUMBERS

International atomic weights for 1918, O = 16. The international atomic weights are fixed yearly by an international committee of chemists.

Atomic No.	Atomic Weight O = 16	Element	Sym- bol	Atomic No.	Atomic Weight O = 16	Element	Sym- bol
1	1.008	Hydrogen	H	44	101.7	Ruthenium	Ru
2	4.00	Helium	He	45	102.9	Rhodium	Rh
3	6.94	Lithium	Li	46	106.7	Palladium	Pd
4	9.1	Beryllium (Glucinum)	Be	47	107.88	Silver	Ag
5	11.0	Boron	B	48	112.40	Cadmium	Cd
6	12.005	Carbon	C	49	114.8	Indium	In
7	14.01	Nitrogen	N	50	118.7	Tin	Sn
8	16.00	Oxygen	O	51	120.2	Antimony	Sb
9	19.0	Fluorin	F	52	127.5	Tellurium	Te
10	20.2	Neon	Ne	53	126.92	Iodine	I
11	23.00	Sodium	Na	54	130.2	Xenon	Xe
12	24.32	Magnesium	Mg	55	132.81	Caesium	Cs
13	27.1	Aluminum	Al	56	137.37	Barium	Ba
14	28.3	Silicon	Si	57	139.0	Lanthanum	La
15	31.04	Phosphorous	P	58	140.25	Cerium	Ce
16	32.06	Sulphur	S	59	140.9	Praseodymium	Pr
17	35.46	Chlorin	Cl	60	144.3	Neodymium	Nd
18	39.88	Argon	A	62	150.4	Samarium	Sa
19	39.10	Potassium	K	63	152.0	Europium	Eu
20	40.07	Calcium	Ca	64	157.3	Gadolinium	Gd
21	44.1	Scandium	Sc	65	159.2	Terbium	Tb
22	48.1	Titanium	Ti	66	162.5	Dysprosium	Dy
23	51.0	Vanadium	V	67	163.5	Holmium	Ho
24	52.0	Chromium	Cr	68	167.7	Erbium	Er
25	54.93	Manganese	Mn	69	168.5	Thulium	Tm
26	55.84	Iron	Fe	70	173.5	Ytterbium (Neo. Yb)	Yb
27	58.97	Cobalt	Co	71	175.0	Lutecium	Lu
28	58.68	Nickel	Ni	73	181.5	Tantalum	Ta
29	63.57	Copper	Cu	74	184.0	Tungsten	W
30	65.37	Zinc	Zn	76	190.9	Osmium	Os
31	69.9	Gallium	Ga	77	193.1	Iridium	Ir
32	72.5	Germanium	Ge	78	195.2	Platinum	Pt
33	74.96	Arsenic	As	79	197.2	Gold	Au
34	79.2	Selenium	Se	80	200.6	Mercury	Hg
35	79.92	Bromine	Br	81	204.0	Thallium	Tl
36	82.92	Krypton	Kr	82	207.20	Lead	Pb
37	85.45	Rubidium	Rb	83	208.0	Bismuth	Bi
38	87.63	Strontium	Sr	86	222	Radium Emanation (Niton)	Nt
39	88.7	Yttrium	Y				
40	90.6	Zirconium	Zr	88	226.0	Radium	Ra
41	93.1	Niobium (Columbium)	Nb	90	232.4	Thorium	Th
42	96.0	Molybdenum	Mo	92	238.2	Uranium	U

Now just what does this mean and how does it influence the subject of X-ray or penetology?

Density and atomic weight are the foundation on which a correct understanding of this subject is built and through the understanding of which a proper diagnosis is possible.

A penetrogram is a registration of the penetration of light rays through an area of an otherwise opaque body.

In the study, physiologically, of the area designated and pictured as the dental area, many of the mineral salts tabulated in the above tables are encountered normally. The individual atomic weight is fixed. Their density, however, may vary. Thus alveolar process, while bone structure and having the atomic weight of bone, is not as dense nor has it the density of the bony substances of tooth structure and the enamel of teeth. All tissues contain carbon. However, we know that it is variously pictured. Anatomically we know the normal position of soft tissue and bone structure. We know the position of the teeth in the alveolar process as well as the situation of normal bone cavities and canals. Each of these variations in structure, though making no change in the atomic weight as a whole, bears an important influence on the density of the structure as a mass.

Penetration of a mass is dependent upon the resistance the substance of a mass exerts against the force of penetration.

The force of penetration in the instance of penetology is the force developed by the propulsion of a bundle of rays which emanate from the target of an X-ray tube. Their force is greater than the rays of ordinary or solar light in that they are specifically induced and assembled and the distance of their travel is not great. Their specific quality is the shortness of their length. Because of the short wave length, in a given space of time, a greater number of waves of short length will have driven their force against an area, than waves of longer length. That light waves of any character will penetrate substances of light atomic weight is a known fact and constantly proven. That the rays from an X-ray tube penetrate some areas with greater ease than others is also being constantly demonstrated. Those areas of easy penetrability are the softer tissues of the body in contra-distinction to those of lesser penetrability, as bone. In dental operations metals are used and they in turn prove their difficulty of penetration because of the lack of reduction to be noted on a film indicating their presence.

The arguments therefore which can be presented for the study of the subject of X-ray or as here termed Penetology, as the study of the penetration of light rays, are many. It will be the purpose of this department to describe step by step how applying the idea of the penetration of light rays to the subject of penetology, (Roentgenology), the possibility of making an accurate diagnosis is simplified and a standard for accurate discussion and presentation of ideas is developed, not based on a matter of personal opinion but rather on established facts and the known forces of elements.

To many it may seem inconsequential to discuss the difference between diagnosis and interpretation of the penetrogram. The importance of understanding this difference is by no means idle thought. The interpretation of the penetrogram is as essential to a correct diagnosis as is the

knowledge of the changes the anatomical parts which enter into the area portrayed may undergo, during the process of alteration from health to disease.

The diagnostician recognizes variously diseased conditions through visible changes as well as from the history of the case as presented by the patient. In his mind's eye he pictures what changes have taken place within a tooth or bone area to cause what he can see, and be the cause of symptoms the patient explains.

The interpreter of the dental penetogram who understands light penetrations and can describe to himself or others the physical appearance of what is pictured can either confirm a diagnosis or authoritatively question one.

The penetogram and particularly the dental penetogram is an accurate and a reliable registration of internal conditions of a mass, even the molecular and atomic arrangement of a mass. The difficulty of the interpretation lies in the fact that our education in this direction was begun in an improper manner, in that we have always looked for gross and coarse changes to depict an abnormal condition whereas more valuable data can be assembled from the appearance of fine shadows and even the shades of shadows that can be noted. By the interpretation of the finer lines first, a diagnosis of greater reliability can be made than that of an expert having all clinical and physical data at hand. Local changes of even acute character can be pictured. They are made visible. They can be read but they are not often interpreted.

It is therefore more important and essential at this time to learn how to interpret rather than to diagnose. The diagnosis comes as a matter of course and is simple to the trained scientific man who knows his pathology; however, to him an interpretation is a difficult thing if unlearned. Through the inability of the majority to disassociate interpretation and diagnosis long enough to learn to correctly interpret a penetogram, there has lately been much confusion, and statements are often heard that the penetogram is not a reliable source of information.

This statement is challenged.

The penetogram is an absolute record. It is impossible of variation. The error lies with the reader in his inability to make a proper interpretation and therefore his diagnosis from the picture is faulty.

In reading a penetogram one must be true unto himself. To be true unto himself he must not feel that because he can and has produced a number of pictures of areas where patients have manifested symptoms and has or has not seen pictured what to him is commensurate with the pathology he knows exists, that he has mastered interpretations. Such a person is the very one who is hard to convince of the absolute reliability of the dental penetogram. He has learned his lessons from the wrong end. He must begin again. He must first know the normal, and the appearance of the normal from various angles and with a varying degree of light force or penetration. He must know the latitudes between which the normal

may range. He must be in a position to classify shadows and to recognize these various classes as they appear and where they appear, either as the expression of the normal or of the pathological.

The classification of shadows therefore will be taken up in the next paper appearing in this department, and here again it will be shown that much of importance in the interpretation of a penetrogram (the radiogram or roentgenogram or X-ray picture) has been overlooked.

Questions bearing on this subject as presented, comments or any matter of common interest in this department will be gladly published if sent to the Department of Penetology, c/o THE DENTAL SUMMARY, Toledo, O., or addressed directly to Dr. W. A. Lurie to New Orleans.

Those who have heard Dr. Lurie's lectures and know of his work are particularly urged to contribute, giving interesting case histories and the results of treatment that has followed a correct interpretation of the dental penetrogram.

QUESTIONS AND ANSWERS

H. H. M. Differentiate between bone absorption at apices due to pyorrhea and apical abscess.

ANSWER: The pyorrhetic condition develops about vital teeth and abscess formation is more common about non vital or devitalized teeth. Apical pyorrhea is most often secondary to alveolar absorption which is usually pictured either mesially or distally of a vital tooth, while the non-vital tooth is more prone to be the site of an apical abscess.

D. G. Can a diagnosis of the presence of pus be made from an X-ray picture? (He means penetrogram).

ANSWER: No; however the penetrogram can display some highly presumptive evidence of its presence.

This subject will be taken up in detail in a subsequent paper.

PENETRATION PARAGRAPHS

In *Oral Hygiene* of July, 1921, Dr. Howard R. Raper, in speaking of the post-graduate work in radiodontia conducted by Dr. Clarence O. Simpson, ruminates over the term "systematized technic" used by Dr. Simpson in place of the term "standardized technic," which Dr. Raper and myself have so often used. Quoting Dr. Raper, and here I believe we all agree with him, "Standardized radiodontic technic is certainly a thing to be desired, but just at present it seems to be beyond us. About the best we are able to do now is to systematize our technic and thus work toward a possible future standardization."

Shall we work for a system of roentgenographic or radiographic or penetrographic portrayal, or shall such portrayal be standardized so that no matter what system is used a certain standard of efficiency must be attained?

Dr. Raper admits the necessity of standardization, and in the same breath decries it as impossible at present, but a thing for the future to attain. Why lower the goal, Doctor, by calling it by another name? Why let the man who masters a system of technic and produces good pictures or indifferent pictures which he knows nothing about, feel that he has gone to the greatest possible height in radiodontia because the standard

is so far in the future one is afraid to look at it? Why back down from the commendable position assumed in the June issue of *Oral Hygiene*, where various angles and positions for the various teeth are so well described and the use of an instrument for standardization, pictured? Perhaps, as you have often said, "When you think you are correct in a matter, you immediately find out that you are wrong," is the reason for your present withholding your idea of "standardization" for that of "systematized technic."

Doctor,—ideals exist in every walk of life and even in the paths of the specialists in radiodontia. You have yours and I have mine. Why tear them down because we find them a little bit hard to strive for and perhaps a bit too far in the future? Standardization is the ultimate goal. Those of us of this day may never reach it, but that is no reason for our not attempting it.

In the past, I have often mentioned "standardized technic" and have gone so far as to mention and attempt "standardized interpretation," and I do not feel it too harsh and uncompromising and unyielding a term. It may be that the reason for our variation in ideas is that we do not equally believe things possible relative to the radiogram. We might aid our knowledge by naming it a "penetogram."

It is admitted that system is a pre-requisite to standard, but nothing is successful without system. This applies to roentgenography from the time a machine is installed to the time of the ultimate reading of the picture. There is a perfect—no, not perfect, but it should be—system of motions, actions, force and results in a necessary and regular sequence in which events must follow to develop the ultimate,—a dental roentgenogram.

A standard must be made and a standard must be attempted at least as equally efficacious as it is in the whole practice of dentistry of today. As the possibility of better pictures, and better interpretation of these pictures advances with improved technic and better apparatus, the "systematized technic" becomes more simple and the "standard" must advance.

As a matter of fact, it is more truly put that "standard" is a more flexible entity than is "system." Let us therefore work for a high standard of work and a high grade of knowledge of what constitutes a good interpretation of a picture, and then the system or systems will take care of themselves, for system depends greatly on the apparatus a man uses to take pictures or the facilities he enjoys in the making of them. All should attain a standard even though they do make use of a variety of systems.

The reprinting of roentgenograms for the purpose of illustrating a paper or as illustrative of a given case is a very difficult matter. Because of the process of making electrotypes, much detail is lost in their making. Many pictures lack sufficient detail to afford a loss, particularly at the critical point. When illustrating any papers for this department (and it

is hoped that you will use this department as your own to tell the entire profession your interesting things in the branch of X-Ray, or Penetology as we are naming it), use good negatives with sharp detail and as much contrast as possible. This department is for all the readers, the operating professional, man who works on certainties, and the beginner, therefore the more matters of interest and from greater number that are published, the better it is.

So if you have anything to say, let us hear you say it.

There is a commendable spirit to be noted throughout the dental profession that all work before being undertaken should be reviewed by a radiogram (penetogram) and after completion again be checked-up by pictures. This is approaching utopia in dentistry and is undoubtedly a wonderful step forward in preventiveness in both dentistry and medicine. The direct result of the idea of carefulness is a greater number of machines required to carry out the necessary work in detail. Many young men with small practices are putting in their own machines and as is often said, "it will soon pay for itself." Yes, Doctor, the X-Ray machine will soon pay for itself; but in the meantime what becomes of the conscientious dentist, in love with his chosen profession, who would rather work at the chair than in the dark-room? He refers his patients to his brother practitioner for picturing, where the bill, per picture, is paid in cash. In paying for his X-Ray machine the young practitioner gets a fee per picture which does not leave the dental practitioner the latitude of doing his dental work for a reasonable fee. This of course is in the instance of the daily wage earner who in turn constitute the bulk of any one man's practice. Yes, your X-Ray machine will pay for itself, but don't let it do so by debiting from the general practice of your profession. Take pictures, many of them and often; but be careful of the fee and don't expect the machine to pay for itself too quickly. Do it gradually.

DON'T let ambition
kill your ethical sense.

CONDUCTIVE OR BLOCK ANESTHESIA FROM THE VIEW-POINT OF THE GENERAL PRACTITIONER*

BY JACK HEARNE, D.D.S., FORT WORTH, TEXAS

IT IS NOT MY INTENTION to go into detail of technic, but rather to confine myself briefly to the advantages to be derived from the knowledge of conductive anesthesia as a general practice-builder.

When one grasps the importance of conductive anesthesia, I am sure he will not stop until he thoroughly familiarizes himself with the subject.

As we know, in the past the laity has associated the word dentist with pain. I feel that the use of an anesthetic by the general practitioner would be a great boon in eliminating the fear of pain.

Compared to all known methods for producing temporary and local anesthesia, the block method takes first rank. Its potency, its simplicity and its marvelous localizing effect in its range of action upon the nerve trunks and tissues, coupled with its apparent safety, makes it the boon of boons to those requiring an anesthetic for the amelioration of physical pain.

There is not the least doubt as to the safety and results of block anesthesia in the hands of an expert. But its usage should be taken sufficiently serious by the general practitioner for him to thoroughly familiarize himself, not only with the anatomy of the parts in which he is to make injections, but also with the methods by which the injections have been most successfully made.

I think there never has been a subject in dentistry so thoroughly outlined as to technic as block anesthesia by Dr. Arthur E. Smith, and I am glad to know he is with us in Texas again helping the general practitioner in the art which he has mastered.

We in general practice should keep in mind the importance of sharp cutting instruments, and should not at any time expect the anesthetic to take the place of sharp burs and instruments in our cavity preparations.

I would like to call your attention to the benefits to be derived from block anesthesia as a time saver. For instance, by blocking the mandibular nerve it is possible for the operator to place the rubber dam, prepare several cavities, place the fillings or extirpate a pulp, and if need be, remove a third molar, and dismiss the patient with the thought that pain in dentistry has at last been eliminated.

I am sure it would take double the time with the results not equal, and the patient not as well satisfied, when the operator is not qualified to block the nerve.

*Presented at the Annual Convention of The Texas State Dental Society, held at Dallas, March 3-5, 1921.

The public knows that this is being done by ethical practitioners and is beginning to demand it more and more, so each one of us should prepare to meet the demands of the public, thus maintaining the respect of the profession.

The remark is being made that nerve blocking is difficult and complicated. It is, if the operator thinks he can employ the same careless technic that is usually employed when an injection is made into the local tissues, for a simple extraction.

If we know the nerve supply to the different teeth and surrounding tissues, and are familiar with the anatomical guides that will enable us to inject a sterile solution around these nerve trunks, then all we need is practice.

There are indications and contra-indications, we should know. We should know our solution to be injected, the quantity indicated for each injection; we should know the meaning of the words hypotonic, hypertonic and isotonic, and strive to use the isotonic solution.

It is essential to equip yourselves with efficient appliances before attempting the various injections.

If you will give these few essential points a little study and attention it will take only a short time for the dentist to become quite thorough in the art of nerve blocking, thus giving assurance to himself and gaining the confidence of the patient.

IN the end, the things that count are
the things you can't count.

LEGAL DEPARTMENT

CONDUCTED BY ELTON J. BUCKLEY, 643 LAND TITLE BUILDING, PHILADELPHIA, PA.

Where Ingenuity in Contract-Making Went Too Far.

Ingenuity on the part of one party to a business contract, an order for example, occasionally overreaches itself, as is illustrated by a case which has just been decided. Every reader hereof is familiar with the plan adopted by many manufacturers and jobbers, particularly manufacturers, to keep their salesmen from closing contracts. In order to keep the control of their selling always in their own hands, they allow their salesmen to take orders all right enough, but print on them something like this: "This order is not to be considered accepted by the seller until countersigned by the secretary of the R. M. Jones Co." The object is to allow the house to pass on every order taken by the salesman before assuming responsibility under it. Then occasionally a seller will attempt to escape from such an order, when the market has advanced, on the plea that it had never become an order because it was never countersigned. There are quite a number of such cases. Where the seller had never done anything with the order the courts have always held that the defence was good—if it had not been countersigned it was not an order, and the seller didn't have to ship the goods. Where the seller had *done something* with the order, however, as for instance, where he had written acknowledging the receipt of it and stating that the goods would be shipped in due course, the courts hold that the countersigning provision was waived, and the order was good without it.

The case referred to a moment ago grew out of a contract provision such as we have been discussing, and decides that what is sauce for the goose is sauce for the gander. In other words, if an order isn't an order for the *seller* until it is countersigned, it isn't an order for the *buyer* either, and he can cancel it at any time before the countersigning.

This is a good thing for both sellers and buyers to remember, if they deal with any form of contract or order containing a provision that the deal shall not be considered closed until the contract or order is countersigned by somebody or formally passed on and accepted by the house.

In the case under discussion, A gave B's salesman an order for certain goods. The order contained a provision that until it was accepted by the signature of one of the seller's officers at its home office, the order should be considered merely an "offer to purchase." The same old scheme in slightly different form, intended to hold the deal open until the house passed on it, and, if it decided to assume responsibility, accepted it over some officer's signature.

After the order had been signed by A and delivered to B's salesman, A changed his mind—claimed to have misunderstood the terms or something, and notified the salesman that the order was cancelled. The salesman refused to accept the cancellation, forwarded the order to the house, it was duly accepted by an officer's signature, and the goods came forward. A refused to take them on the ground that he had cancelled the order at a time when he had a right to do so, and the seller brought suit, claiming that A had no right of cancellation after the order was signed and delivered to its representative.

When the case came up for trial the court decided it squarely against B, the seller, as it seems to me it was clearly bound to do. In substance, it held that the seller had itself provided that the order should not be binding until countersigned by some officer. Until that time it was, as the seller itself had provided, nothing more than an offer to purchase and, like all offers to purchase, could be withdrawn at any time. The following is from the decision:—

While the defendant and the agent were still together and immediately after the order had been pocketed by the agent, it developed that he (buyer) had misapprehended the terms of the order in a certain material particular, and thereupon he declared the order withdrawn and requested that the writing be returned. This the agent declined to do. Evidently he sent it forward, as in due course the goods were shipped and the shipment arrived in defendant's town countersigned to him. His refusal to accept delivery brought on the suit.

The due execution of the order is not denied by defendant (the buyer); neither is it denied that it was delivered at the same time to plaintiff's (seller) agent with whom the transaction was had. By its express terms it could operate only as an offer to purchase pending acceptance by plaintiff, to be evidenced by the signature of one of its officers. Hence, in the meantime, like any other offer, it was open to withdrawal at defendant's (buyer) pleasure and that is what happened.

This law would apply to any contract or order which by its express terms, or by the custom between the parties, had first to be accepted by the house at the home office before it became binding. Such an order can always be cancelled before such acceptance. Of course when the salesman has the right to accept orders then and there, there is no right to cancel after the order is signed and the salesman gets it.

(Copyright, January, 1922, by Elton J. Buckley,
643 Land Title Building, Philadelphia, Pa.)

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

To Tighten Needles

When platinum needles become loosened in the hub wrap a piece of tin-foil around hub and needle and fuse in a small flame. As the needles are expensive it is quite a saving. I have used them this way for several weeks.—C. A. Wright, *Hartford City, Ind.*

Difference in Appearance of Instruments

I have found that making the handles of my much used instruments as different in appearance as possible a distinct time saver; it also saves the work of focusing one's eyes—a real work.—F. A. Graham, *Harbor Springs, Mich.*

Taking Impressions for Inlays

In taking impressions for inlays, oil the wax, and see how much smoother the inlay comes out.—P. Chater Charlton, *Dental Science Journal of Australia.*

Teeth and Systemic Disease

As a general surgical principle, all dental infections detrimental to health should receive indicated local treatment as similar conditions in other parts of the body, but the writer desires to emphasize that with a picture of 90 per cent. failures before them, dentists should be very conservative in promising to cure systemic disease by the extraction of teeth.—R. G. Snyder, *Dental Cosmos.*

Cotton Rolls

It has been the practice to place the cotton rolls horizontally, or parallel with the line of occlusion and in the buccal space. But if a stiff cotton roll (large one) about two and one-half to three inches long (the ordinary six-inch roll cut in half) be placed perpendicularly in the mouth, say from the upper first molar to the lower first molar, you have a natural brace, keeping the buccal walls distended, and with the saliva ejector you have a perfectly dry field. Also you have a very effective but gentle means of holding the mouth open.—R. W. Burch, *Dental Facts.*

To Keep Flask Bolts Clean

Leave them in a shallow bowl, containing a 10-15 per cent. solution of carbonate of soda when not in use. A piece of zinc in the vulcanizer pot will also keep the flasks and pot clean.—C. Bernard Kay, *Dental Science Journal of Australia.*

Matrices for Plastic Fillings

After preparation of a complex cavity, press softened modeling compound into the same and adjoining interproximal space. Remove compound from cavity with warmed burnishers and finish with burs. Coat the surface of matrix with vaselin or cocoa butter, and after inserting filling leave the matrix in place until the filling is set. Where it is difficult to retain the matrix in place, or where there is no tooth approximating the cavity, a ligature may be incorporated with the compound while plastic and tied around the cavity tooth. Cement matrices are made by using a slow-setting cement, mixing until it can be rolled between fingers and manipulated the same as compound, except that the instruments are oiled and used cold. Obviously where rubber dam is used, the matrix is applied after the dam is in place, and in the case of alloys the matrix is left until the next sitting.—*Jospeh Homer, Dental Cosmos.*

Root Filling and Wholesale Extraction

It is refreshing to note by a perusal of our dental literature that many who had thrown away their nerve brooches and rushed to purchase forceps, are again beginning to think that perhaps an occasional nerve canal really might possibly be filled, and are again purchasing a few nerve brooches, just a few as yet, but they will get back to larger orders if not crowded. We do not see so much about the 100 per cent. clubs as we did twelve or eighteen months ago.

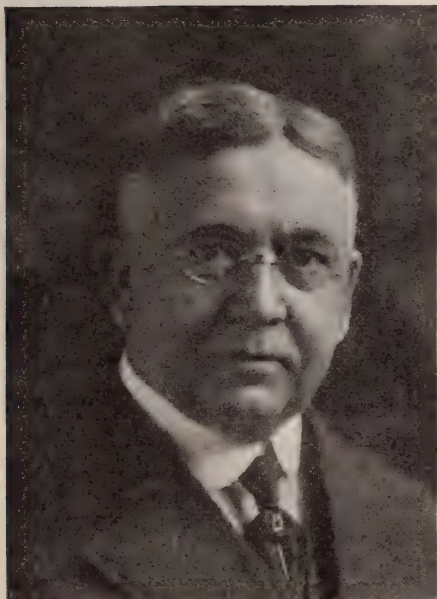
Because the X-ray revealed to us many of our defects in the filling of root canals, this should be no reason for the throwing up of hands and quitting, but rather that we should put forth greater effort to succeed in that wherein we had sometimes succeeded and wherein we had sometimes failed. Even the radiograph is not always infallible. It is, however, a wonderful help. Many roots were filled to give useful, harmless service for years before we had dental X-ray machines. Many others that were attempted proved to be failures. Today, with the use of good technic, assisted by the use of the X-ray, the percentage of failures can be wonderfully reduced, and the matter of wholesale extractions reduced to at least a retail basis.—*J. A. Fleming, Dominion Dental Journal.*

Sensitive Necks of Teeth

Frequently we find that, following upon recession of the gums, the necks of teeth about the position of the junction of the enamel and cementum become extremely sensitive, without, however, any caries being established. Carefully dry any such area, using the electric hot air syringe, and pack with a ball of cotton a small portion of "Lilley" desensitizing paste (Buckley) against the exposed dentinal tubules, and seal to place with Ash's Crown Sticky Wax, applied with a small heated wax spatula. The sticky wax will hold the paste in position better than calxine for a period long enough to ensure desensitization of the surface involved.—*Ernest F. Deck, Dental Science Journal of Australia.*

OBITUARY

Dr. Frank H. Honey



DR. FRANK H. HONEY

At Battle Creek, Michigan, November 18, 1921, Dr. Frank H. Honey, aged 66 years 6 months and 12 days.

Dr. Honey was born in Newcastle, Ontario, May 8th, 1855;—lived on the farm at Mitchell, Ontario, until he was twenty-one, when he moved to the United States. He began practice of Dentistry in Charlotte in 1883. In 1900 he moved to Battle Creek where he practiced until his death.

Death was due to acute dilation of the heart and was instantaneous. Funeral was held in the Masonic Temple. Among those attending the funeral were upward of sixty dentists from various parts of Michigan.

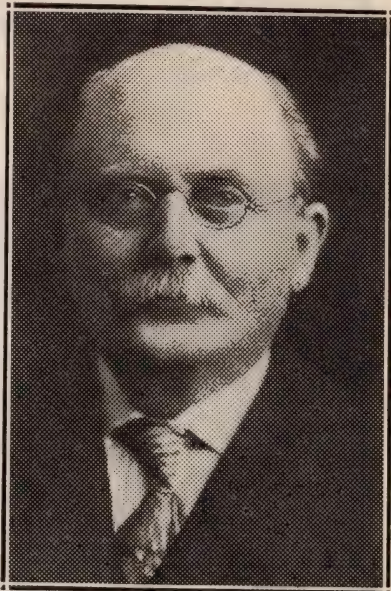
He left a wife and one daughter, Mrs. Harold Metcalf, of Battle Creek; also seven brothers and one sister. In the dental profession he had two brothers S. W. Honey, of St. Joseph, and E. A. Honey, Sr., of Kalamazoo; also two nephews, A. D. Honey, of Battle Creek, who succeeded to the practice, and E. A. Honey, Jr., of Kalamazoo, Michigan.

He was very highly respected by those in the profession, both by reason of character and also the quality of his dentistry, as well as in a social way by all who knew him. It is interesting to note that his office was kept in so orderly a manner that a complete inventory of his equipment occupied but two hours. He became a member of the State Dental Society in 1888 and has rarely missed a meeting since that time, as he has always been interested in giving his patients the highest type of service possible.

Dr. B. F. Johnson

DR. B. F. JOHNSON, well known and beloved dentist, died of heart disease at the residence of his daughter Mrs. Clint Bond, in Liberty, Indiana, Nov. 23rd, 1921.

Dr. Johnson was born in Liberty, Ind., in 1854. When old enough to start a career he entered the office of Dr. Grove, dentist, of Liberty, and after "learning" dentistry from this preceptor, started in practice for himself in Brookville. Some years after this he attended the Indiana Dental College, receiving his degree from that institution in 1895. After graduating he began practice in Camden, Ohio, and later practiced in College Corner, Ohio, until 1914 when he sold his office and retired.



In 1916 when attending a meeting of the Indiana State Dental Association he witnessed the clinic by Dr. Rupert Hall, demonstrating his system of impression taking and denture construction. Dr. Hall was assisted by Dr. M. M. House, of Indianapolis. Dr. Johnson was so impressed by the demonstration, that he forgot his retirement, and visited Dr. House at his office, when the meeting closed, and his earnestness and desire for more knowledge of the Hall system so interested Dr. House that he and Dr. Johnson then and there formed a close friendship that lasted until death parted them. Dr. Johnson applied himself to learning the new system of denture construction, and by devoting all his time to this one branch, he became very expert in it. Dr. House was selected by the University of Minnesota to direct the Summer Post-graduate course in Prosthesis, and he took Dr. Johnson to Minneapolis with him several summers, along with Dr. Hale, of Mt. Vernon, Ind., and others to assist in demonstrating. A remarkable thing was the fact that Dr. Johnson "came back" after definitely retiring, and developed such a zeal and enthusiasm for this specialty.

Dr. Johnson did not open another office, but was employed by different dentists, to construct dentures by the Hall-House system, in Elyria, Ohio, Hamilton, Ohio, Evansville, Ind., Richmond, Ind., and other places—sort of doing missionary work, arousing more interest in this important specialty.

Dr. Johnson in September 1876, married Miss Sarah Davis, of Liberty, Indiana. They were blessed with four children, three of whom survive. Mrs. Johnson died in 1914.

The deceased was a member of the Odd Fellows Lodge, the Methodist Episcopal Church, and the Indiana State Dental Association.

Including the pall-bearers, the members of the dental profession present at the funeral were Drs. Kemper, Wyson, Smith, Henshaw, Chatten, Price, Cox, Moelk, Kirkpatrick, Williams, Thompson, Harding and Martin, of Richmond, Drs. Caldwell and Wolfe, of Hamilton, Dr. John Mollineaux, of Oxford, Dr. Fisher, of Camden, Dr. Betteridge, of Carrollton, Ohio, and Dr. M. M. House, of Indianapolis. Dr. House delivered a most touching and beautiful tribute to the memory of Dr. Johnson, concluding his remarks by reciting the following poem:

FRATERNITY

"If I could write one little word upon the hearts of men,
I'd dip into the fount of love and write with golden pen
One little word, and only one,
And feel life's work on earth well done,
For every heart would speak to me,
The children of Fraternity.
The angel throng would sing a song, the sweetest ever heard,
If they could read in human hearts that precious little word.
For kindly thoughts and kindly deeds
Are treasures more than crowns and creeds.
In these the angel host would see
The children of Fraternity.
A man would need no other creed to guide him on life's sea,
If he'd embark upon the ark of true Fraternity.
Love for your fellowman shall be
Your passport to Eternity."

SOCIETY ANNOUNCEMENTS

TRI-STATE MEETING

Missouri, Kansas and Oklahoma State Dental Societies

The Missouri, Kansas and Oklahoma State Dental Societies will hold a joint meeting in Kansas City, Mo., April 10-15, 1922. This event promises to be one of the big and important dental meetings of the year. It will be a big meeting because this will be the annual meeting of each of the three state societies. It will be an important meeting because of the subjects on the program and the manner in which they are to be presented.

The "teaching system" will be used almost exclusively. It is not the intention to present many new things but to have a more thorough and better presentation of many of the older things.

The forenoons of four days will be set aside for lectures to the full attendance by the following well-known men of the profession:

Dr. Arthur D. Black.....	Chicago
Dr. Howard R. Raper.....	Indianapolis
Dr. C. N. Johnson.....	Chicago
Dr. Wallace Seccombe.....	Toronto
Dr. Arthur E. Smith.....	Chicago
Dr. M. M. House.....	Indianapolis
Dr. Frederick B. Noyes.....	Chicago
Dr. Marcus L. Ward.....	Ann Arbor

The afternoon of these same days will be devoted to sectional work. The full attendance will be divided into classes and each class will receive an orderly and detailed presentation of the subject under consideration in that section.

SECTIONAL DIRECTORS

Radiodontia.....	Clarence O. Simpson, St. Louis
Full Dentures.....	Dayton D. Campbell, Kansas City
Anchor Dentures.....	Charles Arthur Furrow, Tulsa
Root Canal Technic.....	W. A. Chamberlain, St. Louis
Pyorrhea and Prophylaxis.....	J. M. Temples, Tulsa
Casting Technic.....	E. H. Hart, St. Louis
Office Efficiency and Assistants.....	C. A. Martin, Winfield
Orthodontia.....	Hugh Tanzey, Kansas City
Dietetics in its Relation to Preventive Dentistry.....	A. L. Walters, Tulsa
Crown and Bridge Work.....	W. A. Coston, Topeka
Block Anesthesia.....	F. C. Reisling, Tulsa
Dental Ceramics.....	J. E. Huff, Kansas City

There will be one day of general clinics by members of the three state societies.

Owing to the fact that the amount of dues collected by most dental societies, are just about enough to pay for "janitor services," it will be necessary to collect a very small fee from each person attending

this meeting. Members of other state dental societies are most cordially invited to attend this meeting on the same conditions as our own members, viz: you must be a member of your state society with your 1922 dues paid in full. Each person must present his 1922 membership card for registration. These rules will be rigidly enforced. The dental society is the greatest educational factor in our profession, hence the benefits to be derived from attendance at a meeting of the magnitude this one promises to be, should make a strong appeal to the members of the profession of this section of the country.

The Tri-State Dental Bulletin will be mailed to any one interested in the details of the meeting, upon request to the secretary.

E. M. HALL, *Chairman*,
Kansas City, Mo.

C. R. LAWRENCE, *Secretary Treasurer*,
Enid, Oklahoma.

Of the Organization Committee.

Dental Hygienists Association of New York

At Rochester, New York, on May 12th and 13th, the Second Annual Convention of the Dental Hygienist Association of the State of New York will be held at the Rochester Dental Dispensary in connection with the New York State Dental Society meeting. All interested are invited to attend. More detailed information will be published later.

Massachusetts State Board

The Massachusetts Board of Dental Examiners will hold a meeting for the examination of candidates on March 21, 22, 23 and 24. Both dental and hygienist candidates will be examined at this meeting. Applications and fees must be filed at the office of the secretary at least ten days before the examination. For full information, application blanks, etc., address Dr. J. N. Carriere, Secretary, 146 State House, Boston, Mass.

Pennsylvania State

The fifty-fourth annual meeting of the Pennsylvania State Dental Society will be held in Syria Mosque, Pittsburgh, April 11, 12 and 13, 1922. An interesting and instructive program has been arranged. Members holding National Dental Association cards from other states, are cordially invited to attend all sessions.

W. L. FICKES, *Secretary*,
East End Trust Bldg., Pittsburgh, Pa.

Alumni Association U. of B. Dental College

The Twenty-second Annual Meeting of the Alumni Association of the University of Buffalo will be held in conjunction with the February meeting of the Eighth District Dental Society of the State of New York at the Lafayette Hotel, Buffalo, N. Y., on Thursday, Friday and Saturday, February 23rd, 24th, and 25th, 1922.

Essays, among others, will include Lecture Clinics on Casting Technic by Dr. C. K. Buell, of Buffalo, N. Y. Full Prosthesis by Dr. Rupert E. Hall of Chicago, Ill., and Dental Ceramics by Dr. George A. Thompson of Chicago, Ill.

A large and splendid general clinic will be given.

The Manufacturers' Exhibit is always of great interest.

The Banquet will be held on Friday evening, February 24th. The classes of 1897, 1902 and 1912 will celebrate anniversaries.

Respectfully yours,

W. RAY MONTGOMERY,

WM. N. BREWER.

National Dental Convention

The twenty-sixth annual convention of the National Dental Association, will be held in Los Angeles, California, July 17th to 21st, 1922.

The Ambassador, one of the city's newest and largest hotels, situated in the heart of one of the most beautiful residential districts, will be convention headquarters and practically all sessions can be held in the hotel or on the grounds.

The Local Committee on Arrangements can safely state that this meeting will provide an excellent program, demonstrating that "Dentistry can add ten years to the average of human life." This committee can also safely state that our visitors will be well entertained during their sojourn in Los Angeles.

It is none too early to plan a vacation, westward, in July 1922 and to send for hotel reservations.

Watch for further and detailed announcements in all Dental Journals.

The Local Committee on Arrangements, per

C. M. BENBROOK, *General Chairman*,

707 Auditorium Bldg., Los Angeles, California.

Alumni Society of the Dewey School of Orthodontia

The next annual meeting of this society will be held on April 27, 28 at the Edgewater Beach Hotel, Chicago. The usual high standard of the meetings of the society will be maintained. All interested in orthodontia are cordially invited to attend these meetings.

GEORGE F. BURKE, *Secretary*,

741-43 David Whitney Bldg., Detroit, Mich.

Tennessee State

The next Tennessee State Dental meeting will be held on May 8, 9, 10, 11, 1922, in Memphis, Tennessee.

Annual Convention Texas State Dental Society

The Texas State Dental Society will hold its 42nd Annual Convention March 13 and 14, 1922 at Houston, Texas.

The special features of the program will be lectures and clinic work by Dr. Boyd S. Gardner, of Rochester, Minn. and Dr. Carl Hoffer, of Nashville, Tenn., with symposiums and unit clinics by members of the Society.

During the four days following, a post-graduate class course will be conducted by Drs. Willis Al Coston, Topeka, Kan.; Russell W. Tench, New York City; Arthur E. Smith, Chicago; T. W. Maves, Minneapolis and Julian Smith, Dallas.

J. G. FIFE, *Secretary*, 1813 Main St., Dallas, Tex.

Kentucky State

The next Annual Meeting of the Kentucky State Dental Association will be held in Louisville, Kentucky, April 10, 11, 12, 1922, Seelbach Hotel as headquarters. A Clinical Program of unusual interest is being arranged. Address all correspondence to W. M. Randall, Secretary, Louisville, Ky.

W. W. RANDALL, *Secretary*, Louisville, Ky.

The World turns around on credit.

What is credit? It's a very special kind of belief. Also it's the measure of your promise to pay. So that people are trusted, not because they have material security, necessarily, but because they have the right kind of eyes, or voice—or courage—by which you know that they will pay!

The late J. P. Morgan many times admitted that he loaned money up into the millions—on character, alone.

One way to find out how big a man is, is to see how much he can borrow. For a big man must be able to borrow big.

Recently Uncle Sam borrowed from his own family over a dozen billions of dollars. And these billions came from children, women, men, and workers of both high and low estate.

The whole world knows that Uncle Sam will pay!

When you are able to borrow big, you will be able to do big. For you will be big!—George Matthew Adams.



NATIONAL DENTAL ASSOCIATION ANNOUNCEMENTS

NATIONAL DENTAL ASSOCIATION

Twenty-sixth Annual Meeting

to be held in

LOS ANGELES, CALIFORNIA, JULY 17 TO 21, 1922

HOUSING HEADQUARTERS

Ambassador Hotel—Official Family

Alexandria Hotel—Delta Sigma Delta Fraternity

Clark Hotel—Psi Omega Fraternity

Hayward Hotel—Xi Psi Phi Fraternity

Registration Headquarters for all Fraternities—Ambassador.

Hotel rates, with reservation contracts may be had by addressing the Secretary or J. Elton Lang, Chairman, Com. on Halls and Hotels, 707 Auditorium Bldg., Los Angeles, Cal.

RAILROAD FARES

The fares quoted herein are as nearly accurate as can be secured until the final tariffs for 1922 are published, and are approximately correct.

The federal tax of 8 per cent. on passenger and Pullman fares will be eliminated after January 1, 1922, making a substantial reduction in transportation charges, and there is a possibility of further reduction in summer fares to the Pacific Coast.

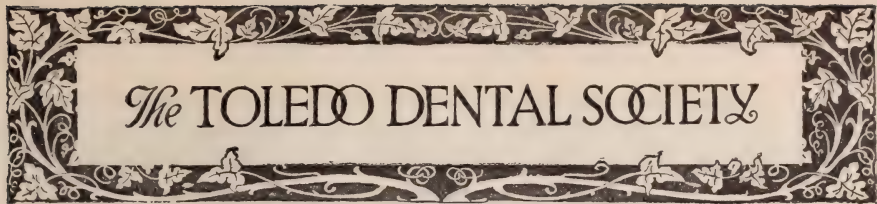
Summer tourist tickets, available for the 1922 convention will be on sale daily May 15, 1922, to September 30, 1922, inclusive, permitting stop-over at any point en route within final return limit of October 31, 1922.

From Chicago and return to Chicago, via any direct route via Omaha, Kansas City or St. Louis, \$106.80.

From Chicago and return to Chicago, via any direct line via Omaha, Kansas City, St. Louis, St. Paul or Minneapolis, \$128.40. Corresponding fares from points east and south of Chicago. Variations from direct routes going and returning may be made by arrangement with local ticket agent. Note the following:

	Direct Routes	One Way via Portland		Direct Routes	One Way via Portland
Boston, Mass.....	\$174.33	\$195.93	Dayton, Ohio.....	\$123.65	\$145.25
Baltimore, Md.....	156.75	178.35	Indianapolis, Ind.....	117.48	139.08
Buffalo, N. Y.....	140.76	162.36	New York, N. Y.....	165.61	187.21
Cleveland, Ohio.....	128.97	150.57	Portland, Me.....	182.17	203.78
Columbus, Ohio.....	126.64	148.24	Philadelphia, Pa.....	159.78	181.38
Cincinnati, Ohio.....	123.65	145.25	Pittsburgh, Pa.....	137.14	158.74
Detroit, Mich.....	124.43	146.03	Toledo, Ohio.....	121.95	143.55

Further information as to program will be printed in later issues.



OFFICERS

W. H. HISEY, 1201 2d Natl. Bank Bldg.

President

C. H. COX, 714 Nicholas Bldg.

Vice-President

G. E. MARKLEY, 320 Superior

Secretary

F. B. CONKLE, Wedgewood Bldg.

Treasurer

Forty-two members reserved plates for the dinner January 13, and the meeting proper opened with about fifty in their chairs.

There was some discussion of a proposition to assess the price of the dinner, against members who reserved plates and then did not show up, as the number reserved must be paid for out of the treasury whether such members are in attendance or otherwise. The idea strikes the writer as being just about right, but somehow the majority present didn't agree to it, and the matter still stands as it always has. One reason advanced for not favoring the assessment was that if members knew they would be called upon to pay for reservations whether they attended or not, they simply would not send in the cards, which would make matters worse instead of better. It would show a good spirit if such members would voluntarily hand in the price of the dinner, when prevented from making good their reservations, and would save the Society some little money in the course of a season. It doesn't seem that any man would be willing to have the Society pay for his dinner, once the matter had been called to his attention. Nufced.

Dr. L. L. Sheffield presented his State Convention paper on denture prosthesis, which is now in the hands of THE SUMMARY and will be presented soon. His slides are particularly fine. Illustrations for the magazines will be made from them. The reading and explanation of the slides was followed by table clinic from models.

The Society as a body was invited to attend a wedding that is scheduled for this month, with the proviso that each should "bring his own," whatever that may mean.

Resolutions were unanimously adopted expressing sympathy for President W. H. Hisey on account of the illness of his wife.

Wonder what the result would be if more of us placed our Society duties slightly ahead of our personal inclinations? Possibly we would find, in the end, that such service would also serve ourselves best.

DIET FOR HEALTH, COMFORT AND EFFICIENCY*

BY GEORGE E. HARTER, TOLEDO, OHIO

WHEN I ACCEPTED the invitation of your program committee it was in the expectation of wandering around from Dan to Beersheba in a talk to be limited only by your patience and my powers of endurance. However, since that time several things have occurred to induce me to change my alleged mind and write what I have to say, in order that the time consumed might be limited to some degree and that which is given might be as thoroughly practicable and applicable to everyday living as possible.

As you know I have been interested in these topics for many years. My interest was first aroused by hearing the report of a very near friend, made at the conclusion of ten years of constant and unremitting labor in clinic and laboratory—conclusions which were so completely accepted by the medical fraternity that they are now regarded quite as matters of course.

I feel that I was signally honored in being called to Chicago to listen to this report, since I was the only one of the seven men who heard it who was not a physician of note, one of them coming all the way from Japan for the sole purpose of hearing it.

Since that time I have read everything worth while on the subject of diet—and very, very much that was worth nothing; worse than that, much of the matter written and printed on the subject is harmful, almost pernicious if accepted and acted upon. In all that time, now nearly ten years, not one new thought has been added to that given by my friend to that little assembly at the LaSalle hotel in Chicago.

Many men have appeared before the public with so-called original matter, claiming, at least by inference, to give the results of their own research. It is quite likely that, so far as they have known, their matter has been original. But to me it has been only restatements, with, possibly, added emphasis upon one or more of the many phases of this most multiplex and complex subject.

So far as originality is concerned, not a mite of it was claimed by my friend for his work. He was a student, a reader, and a thinker. He knew the so-called myth concerning Prometheus who was chained to a rock by day, while vultures dined upon his vitals, which were restored each night during sleep. This suffering of his was said to have been decreed by Jupiter or Jove as punishment for having stolen fire from heaven and applying it to human uses.

Reading more deeply into this myth than most men are capable of doing, this friend of mine found in it another great fact: It was

*Read before the Toledo Dental Society, October, 1921.

not the stealing of the fire, nor yet its application to human needs in general that constituted the gravity of his offense, but *the use of that fire in the cooking of food*, while the suffering undergone, the tearing of his vitals, most certainly may be construed as the tortures of dyspepsia brought about by the eating of cooked and "doctored" foods, and everything that accompanies them in the ordinary dietary.

The use of fire certainly covers a multitude of dietary sins. Does the housewife suspect that part of the food in her refrigerator will not "keep" until she expects to use it, onto the range it goes, it is heated to a higher or lower degree until signs of fermentation disappear, when, presto! back into the refrigerator it goes, with all apparent deterioration obliterated.

Does a can of fruit in the store-room begin to hiss or leak a little, the can is opened, contents dumped into a stew-pan, brought to a boil, and either re-sealed in the can or used immediately to make some of the delectable messes that certainly tickle the palate whatever they may do to the inner economy of the man!

It is not necessary for anybody to tell you what has been done and what has not been done. Should there be any doubt as to what has NOT been done, try a little experiment yourself. Just allow the contents of such a can to stand unsealed for a day or two and then stick your nose into it. Fermentation or putrefaction has been checked, maybe, temporarily and the alcohol driven off; but bacteria have ways of changing their forms, of protecting themselves against the action of moderately high temperatures. What undoubtedly has been done is merely the removal, from the range of sense-perception, of the products of fermentation or putrefaction.

As Herbert Spencer would say: "The inevitable conclusion seems to be," that the only safe and sane thing to do is to consign to the garbage-can or the incinerator every trace of food that reveals the slightest evidence of taint. Don't eat it; don't allow your dog or your cat to eat it.

As an incident illustrative of the wonder-working power of fire, I learned the other day of an ice-cream manufacturer who bought up a carload or two of over-ripe butter, passed it through some heat-and-chemical process, and made it up into Neapolitan, Melba Peach, or some other form of alleged ice-cream and sold every ounce of it at sixty cents a quart. It was delicious, of course; so are some of the other things that we eat for the sole purpose, seemingly, of making undertakers rich.

Another lesson that might be drawn from the sufferings of Prometheus is: Eat as much raw food as possible. Uncooked food is safe from the death-mask of fire, to say the least, while it contains, unchanged and undiminished, all of the food-value that it ever had, particularly the vital cell-elements just now so much talked and written about as "vitamins."

It always has seemed to me quite obvious that man and nature have developed side-by-side; that the latter produces or can be induced to produce, everything that man needs, in precisely the very best condition to be used as foods. True enough, most of us eat abundantly every day of cooked foods that we could not or would not eat at all in a state of nature—uncooked; but, why eat them at all?

Meat, for example. An hour after the death of the animal it swarms with bacteria. What, then, must be the condition of those simply wonderful steaks, cut from the beef in November and "hung" to "mature" for Christmas or New Year's dinner? Would any of you, after taking a whiff or two of the "breath" of such a morsel, be willing to eat it uncooked? Hardly! Yet all that fire does to it, besides making it wonderfully "tasty," is to camouflage it, hide the disease-traps in it. Most of us know that meat forms one of our very poorest of foods. If forced to do without it for a year or two, we never should miss it. For more than three years I ate no meat, fish nor fowl. At the end of that time I was in better physical trim than ever in my life, before or since. When I decided to stop eating meat, I was a tremendous meat-eater; no meal was complete that did not contain at least two kinds. I weighed 225 pounds. In a year of abstinence from meat, without any other change in my regimen, I had reduced to 180, and was hard as nails. In fact, it was largely my improved physical condition that led to the resumption of meat-eating to a limited extent.

What is the explanation of this seeming paradox? This: Among other improvements was a tremendous increase in the efficiency of all the physical senses, notably the sense of smell. My scent was as keen as that of a hound. In walking along the streets and turning a corner, I should smell blood distinctly did there happen to be a butcher-shop or meat-market in the block. I could smell a butcher or a livery-stable keeper across the street. I knew by the odor the kind of meat that every man who called at my office during the day had eaten for breakfast. You may easily imagine other odors that failed to add to my comfort. Things became so bad that, finally, I was fairly driven to resume the eating of meat. Today, I have no desire for it. I eat it once or twice a week as a matter of convenience and self-protection. Like alcoholic drinks, while I have no desire for them, I like the taste of all of them immensely. I enjoy almost all kinds of meat, but never should I think of ordering or eating it but for the reasons given.

In every sort of athletic contest requiring enduring strength, meat-eaters have been compelled to yield the palm to fruit and vegetable-eating people. Thirty years ago the athletic director in one of our large colleges prepared himself for a lifting-contest by eating nothing but apples for six weeks. He lifted two horses, each weighing around 1800, by means of a platform and harness. I doubt if his feat has been surpassed. We all remember the incident mentioned in one of the books of the old testament, in which a number of young men were con-

fined in the temple and had no food other than unleavened bread for some weeks. They came out "fairer and fatter" than when they went in, and excelled greatly other young men who had lived upon the conventional diet of the period during the same time. But—and this brings me to a vital part of my topic:—

The bread they ate was not modern baker's bread, nor even "mother's bread," made from our much-boasted snow-white refined flour. Had they been required to live upon such "chips and whetstones," they would have perished of hunger with their bellies full of it. Do you know that mice and rats will not eat bread made from ultra-refined flour? Do you know that wevils avoid it? Do you know that the great milling establishments up at Minneapolis could not stay in business if they made any other kind of flour? Good flour will not keep more than a few weeks. And that is the reason back of our highly-refined foodless flour.

Try this experiment: Dig the crumb out of a piece of bread and roll it between thumb and fingers until you make a ball of it. Put it in your pocket and carry it there until this time tomorrow; then examine it. The next time you are tempted to eat that kind of bread, ask yourself how you would like to fill your belly full of marbles. Suppose you toast a piece of that same bread: then try to roll a ball of it. It will crumble. Toasting adds no virtue to the bread, but it does break it up so that the digestive fluids can get at it.

Bread is a starch food. So are potatoes and rice. They all contain starch, but there is a difference in the proportions of their elements. They do not agree with each other. If your system needs starch, it will take up and use readily either ONE of the three, but will reject all but one of them if taken together. Therefore—Do not eat bread and rice, bread and potatoes, or potatoes and rice—any two of them, at the same meal; that is, if you want to be really well.

Speaking of being "really well" calls up the question—How many people really are well, actually well, in any accurate sense. To be well means much more than to be free from pain and disability. It means to be vibrant with health; to get up in the morning gladly, anxious for the duties of the day; and to end the day fatigued, possibly, but quite as comfortably as it was begun, ready, after a brief rest and a good dinner, to enter into almost any kind of recreation with zest and vim.

Many men who think they are well are nursing some slow, insidious, preying disease that sooner or later will get the best of them, and slowly but with deadly certainty, pull them down. Many of these troubles give no sign until some incident lowers vitality, drops the natural resistance of the body below the danger point; when they make rapid headway until the estate of the victim is called upon to add a considerable contribution to the exchequer of the undertaker.

Most of these troubles are due directly to some form of indigestion, which may have little or nothing to do with the stomach or the so-called

digestive tract. The only true digestion is cell-digestion. The sole purpose of the stomach is to act as a sort of soaking-tank in which food is prepared and converted into fluids that may be conveyed through the lymphatics into the blood-stream, which acts as a sort of Mississippi river, carrying the prepared foods to the cells in different parts of the body. The cells of the stomach, for instance, may be starving, although the stomach-walls are distended with just the food-elements they require. They cannot take up and utilize the foods the stomach contains. They must pass through many processes, be loaded upon the current of the blood, pass through heart and lungs and be returned through the lymphatics and arteries before they can be absorbed and really digested by the cells.

As the supplies of food pass through and around them, the cells take what they need, if they can get it. One source of nutritional troubles is that the cells, like the body as a whole, are fatalistic in instinct. If they cannot get what they want, what they need, they will do the best they can, take the next-best that offers, although that same next-best may be slow poison, or it may act with the rapidity of lightning.

Have any of you ever seen a blood-cell proliferate upon a coated slide of the ultra-microscope? It is a beautiful and most interesting process, revealing the method of growth that applies to everything physical. One interesting fact in connection with this process is that one minim of a 90-100 per cent. chlorid-sodium solution will stop proliferation—kill the cell instantly. Very high heat, possibly above 400° , will do the same thing. No known degree of cold will do it. Arrhenius, from the great Stockholm University, visited this country several years ago, visiting one university after another, demonstrating the possibility of life passing from one planet to another through a region of absolute zero. Absolute zero is supposed to be the lowest possible temperature. It is 273.7° below our centigrade zero, which is the melting-point of ice, or 32° higher than Fahrenheit. So, if we could bring our refrigerators down to absolute zero, bacterial life might not be destroyed.

When I first sprung what has been called my anti-salt campaign upon a long-suffering public, I was cheerfully laughed at for my pains. But well-informed people are not laughing at me now. Too many big guns have been fired at chlorid of sodium since then. From Dr. Herman Prinz up, or down, to Kellogg, of Battle Creek, including many writers for the popular press under "Be Well or Get Well" caption, all authorities are condemning table-salt as the author of more dietary evils than any other one thing. One authority says, in substance:

"When the fluid content of the mouth or other cavity in the body is hyper-saline, that is, above the normal solution (around one-half of one per cent.) serumal fluid is drawn from about the cells, then from the cells themselves, for the purpose of restoring isotonism, with the result that the cell shrinks,

collapses, and dries up, resulting in the death of the cell. When the cavity-fluids are hypo-saline, the opposite follows: the cells become distended and finally burst. But there is little danger of the latter, because most foods in their natural condition contain sufficient salt to maintain isotonomism on that side of the scale."

You know what I think about the use of salt. Therefore, there would be nothing added to the gaiety of nations were I to recapitulate. Cut down your ration of salt to the vanishing point. Banish it from your tables, if you cannot bring yourselves to exiling it from your kitchens. You have enough work for your body to do without imposing upon it the constant, unremitting task of defending itself against constant attacks from over-doses of chlorid-sodium. It will struggle like a hero for a long time; but it finally will give it up—and then what? Another contribution to the medical purse, with the sexton forming the background.

The normal body requires a variety of foods, what is called a "balanced ration." Very few of us get it. The housewife should study such matters. Upon her shoulders rests the responsibility of making her table health-giving and life-preserving as well as esthetically attractive. Time is too short for me to go into details along these lines. A card addressed to the Agricultural Department, Washington, D. C., will secure for anyone, free of charge, a series of pamphlets on the Choice and Preparation of Foods, which should be studied and followed.

Foods are of but three sorts—Energy-carriers, tissue-builders, and refrigerants. In the former are grouped all fruits and many vegetables, particularly those that grow above the ground, except beans, peas and lentils in their dried state. Beans and peas eaten green, are still supposed to be good foods; dried, they are merely scavengers. Pythagoras, the great Greek philosopher and teacher, made this a prime condition among candidates seeking admission to his school: He must know some mathematics, some music—and EAT NO BEANS!

Meats, fish, poultry—all animal foods, are tissue-builders, including some of the side-products of animal life, such as eggs, butter, honey, etc. Cream is both building and energizing. It is one of the very best of foods, while some milk is of no value, and may be very harmful. One dietary authority says that the fluid part of milk is merely offal, while the cream is the price the cow pays for saving its life by getting rid of it. It is better to buy pure cream and add water to it yourself. You may at least be reasonably sure that it is free from uric acid.

I know that babies seem to thrive, and actually do thrive, on cow's milk—which bears about the same relation to mother's milk as does near-beer to three-star Cognac; but they also die, sooner or later, hundreds of thousands of them within their first year; while the average of life is only somewhere around fifty, whereas it should be a hundred and fifty, based upon the maturity period as compared with the animal

kingdom. The man who dies under a hundred has cheated himself out of life. Somebody has said that only four per cent. of us die natural deaths—the rest commit suicide, either with our teeth or otherwise, or are killed by so-called accident.

How many of us who die at or below the classic three-score-and-ten do so because of disease implanted in us through cow's milk and the nursing-bottle?

The best substitute I have found for mother's milk is rice-milk, made by slowly simmering rice to a pulp, keeping it well covered with water, mash, strain, add a little cream, a little sugar, reduce to the consistency of milk, and use in place of any other food in the nursing-bottle. I have given this formula to a great many mothers and nurses, and babies seem to thrive upon it. Many who cannot digest cow's milk at all do well on this diet.

As the babies grow older, a beaten raw egg may be added. Later on, the raw egg alone may be given occasionally; then the egg beaten in cream.

Beef tea, extract of beef and such messes have no food value, and may be very injurious. Soups, made from stock extracted from joints and bones of beef, have a too large uric-acid content to be attractive except to those who do not know. Soups are good food if properly made, particularly vegetable soups, the fat-content of which comes from butter or cream.

I know a man who went through a very severe attack of influenza about a year ago. While convalescent he was fed almost exclusively upon bouillion made from beef extract, every spoonful of which added to the poison already deposited in his system. He is still doing everything he knows to rid himself of the effects of those cumulative doses of uric acid.

Rice is a splendid food; that is, the natural, unpolished rice, just as it comes from the thresher. The ordinary rice of commerce has been given a "treatment" that leaves it worse than useless as an article of diet. It is first polished, which removes about ninety per cent. of its nutritive value which is contained in the outer layers, and then, to restore weight, it is given a coat of glucose and talcum.

It is more than suspected that polished rice is responsible for beriberi, that usually fatal form of polyneuritis so common in oriental countries, the beginning of which has been traced to the importation of polished rice from America. In such countries rice forms the staple diet, which, in the case of polished rice, does nothing except to fill the stomach and fool the appetite.

Lettuce, celery, spinach, radishes, onions, cabbage; all such leafy vegetables, are refrigerants; that is, help to hold down and regulate the heat of the body. They also contain vitamins and mineral salts in easily assimilable form. They are very much the best eaten raw, and they can be made very palatable in the form of salads, of which

we eat entirely too few and too small a variety. The French are wiser than we in this regard. The French cook can find materials for a salad anywhere; and, with bread and butter, you have a good meal. The other evening for dinner at my home we had a salad of which unpolished rice was the base, with egg, radishes, onions, lettuce, cabbage, and I do not know what else, all chopped together, yielding a dish that contained more than a thousand calories per portion. When I had finished mine I was offered another, but simply could not eat more. I was abundantly satisfied so far as appetite was concerned, and every atom of it contained food for the cells. Men in your occupation and mine require no more than 2500 calories per day. This salad afforded nearly half a full day's ration. It was tasty, appetizing and wholly satisfactory. An analysis would show that it was perfectly balanced as to proteins, carbohydrates and fats, minerals, acids and alkalies. Best of all, it did not overload either stomach or kidneys. Our drink was buttermilk.

In this connection I want to speak a word for buttermilk and soured whole milk. In the first place, they are almost free from bacteria, and, in the second place, they are a foe to constipation and to the bacteria of fermentation. Of course, there are good and bad buttermilks. Buttermilk from pasteurized milk is almost worthless, is disagreeable to the taste, keeps poorly, and should be avoided. It is very easy for anybody to make his own buttermilk from whole milk. An authority on this subject states that the Bulgarians are probably more nearly perfect physically than any other race, owing, it is supposed, to their consumption of buttermilk. The Irish, it is well known, are splendid physical specimens, with beautiful complexions, splendid forms, and teeth that cannot be beaten. From my own experience I know that sour milk and buttermilk are preferred to sweet milk by many of these people. Considerations of economy may have had much to do with this condition originally, but such is not the case now. The drinking of these milks has become a national habit.

Most breakfast foods are merely slop. If you must begin the day with something supposedly more substantial than fruit, try this: Buy a few pounds of wheat at the mill or feed-store. Wash it through at least four waters, to remove all dust, chaff, etc. Cover it with cold water. Bring it to the boiling point, and then allow it to simmer for several hours, adding hot water from time to time, until it pops open like popcorn. Prepare enough for several days. Eaten with sugar and cream it is delicious. Apple sauce or raisins makes a fine addition. Oat meal, prepared in the Scottish method, also is excellent. Mixing the two, about half-and-half, makes an excellent variation. The Scottish method is the same as the Chinese method of cooking rice. Put a sufficient quantity of cold water on the fire, bring it to the boiling point—see that it is boiling violently. Then stir in the oats slowly, so as not to stop the boiling. Boil for twenty minutes and serve. I do not like oats, but I can eat them prepared in this manner.

Any kind of vegetables are much better steamed than boiled. A satisfactory steamer may be made by fitting a collander into a stewpan and covering it.

Cabbage is much better eaten raw in salads or otherwise than cooked. Steamed cabbage is much better than boiled. Again, the less cooking the better. Cabbage may be cooked thoroughly under steam in thirty minutes. The old-fashioned boiled dinner, of which cabbage is the base, is a dietary iniquity. Long boiling not only destroys every virtue of the cabbage, but reduces it to a leathery mass that requires five to eight hours to pass through the digestive tract.

If you suspect a sluggish liver, or if your complexion is muddy, eat two or three raw carrots every night at bedtime or at any other time.

Onions, raw or creamed, eaten as often as may be necessary, supply a sovereign remedy for nervous debility and a few other things. If you do not like them, have them disguised in salads or in some other way. They have affinity for all toxins in the digestive tract, and carry them out of the body.

Popcorn eaten freely, will remove the appetite for alcoholic drinks. It is an excellent food in itself. I know one man who ate nothing else for three weeks. He was treating himself for alcoholitis. At the end of that period the smell of whiskey acted promptly as an emetic.

Eat plenty of young radishes, tops and all. The tops of radishes, beets and similar vegetables are worth more as food than the roots.

Pickles, olives, preserves, etc., have no place in a dietary based upon efficiency and health. Eat them, if you like, but do it knowing that they are not only of no value in themselves, but harmful, and prevent the proper digestive and assimilation of other foods.

Cheese is a good food, but is highly concentrated and difficult for some people. One dietitian says that if you eat cheese at all, you should eat not less than four ounces of it. My own experience is that a little well-ripened cheese aids digestion, increases appetite, and, in my own case, does no harm. Immature cheese is little short of poison. It is in process, usually is tough and indigestible. Do not buy cheese that does not break off short and crumble easily. I could go into a highly technical analysis of this food, but this is a practical, not a scientific paper, and the time can be used to better advantage, I think.

We gain no strength nor vitality from foods. If we did, the more we ate the longer we should live and the stronger we should be. Food is the fulcrum over which we convert energy into motion, and we always pay a little toll for the process of conversion. If it were possible to measure the energy-content of the food we eat, and then measure the motion into which it is converted, we should find that the process has cost us quite a little through attrition and in other ways. We cannot eat our cake and still have it.

Somebody asks: How about banquets, big dinners, etc.? Well, as I am quite as human as the rest of us, I eat them and enjoy them. I think my enjoyment is the more keen and satisfying because of the fact that my daily regimen is extremely plain and simple, and I know that I am better able to handle such a meal occasionally because it is occasional. Just the same, two or three days away from home, being entertained in one way or another, always gives me a bad day or two when I come home. The dissipation must be paid for.

I am inclined to accept the opinion of Dr. Percy R. Howe, to some extent endorsed and amplified by Dr. T. B. Hartzell, that diet has more to do with pyorrhea than any other of the factors concerned. The relation of pyorrhea to scurvy never has been scientifically traced, so far as I know, but to me they seem very nearly akin; so much so at least that, were I a dentist, I should put pyorrhea patients on an anti-scorbutic diet, and keep them there at least while treatment was in process. Salted meats, breads high in starch and carbon, few or no vegetables especially no raw ones, continued over a long period, ought to produce scurvy or pyorrhea in an edentulous patient, to say nothing of one wearing normal dentures! Put such patients on a course of fresh potatoes, onions particularly, with little bread and no salt, while drinking plenty of lime-juice, eating oranges, apples, and other fresh fruits, and you will have much better success in your treatment.

In any diet intended to produce or permit efficiency and good health, care should be taken to secure a good balance between acid-and-alkali-forming foods. An acid-forming food is not one that causes an acid reaction, but one that brings about a hyper-acid condition of the body during metabolism. That the food is in itself acid has nothing to do with the matter. The same is true at the other end of the scale. An alkali-forming food may be one that contains no free alkali whatever.

The acid-forming foods are: Meats, poultry, fish, nuts, beans, peas, other foods high in protein, cereal grains and some fats. All of these except beans and peas, are good food, but must be well balanced with such as—

Fruits, fresh or dried, all of them with the possible exception of prunes, plums and cranberries; all vegetables except those mentioned; milk, particularly buttermilk and sour milk; all the citrous fruits, oranges, lemons, grape-fruit, etc., which are particularly high in alkali-forming qualities. Because of the normal hydrochloric-acid content of the digestive tract immediately after rising in the morning, many authorities recommend that the citrous fruits, particularly grape-fruit, be eaten after rather than before the first meal of the day.

A man who shows excess acid in his system is not regarded as a good life-insurance risk, while, so long as the blood-stream is maintained in an alkaline condition, nothing very serious so far as the common ailments are concerned is likely to be able to get a hold. Alkali is a protective armor that makes us almost invulnerable to infection. That may

explain why several physicians of my acquaintance feel themselves immune during infectious epidemics because of the fact that they carry good solid quids of navy plug in their cheeks while attending patients suffering from such maladies. Tobacco is strongly alkaline.

The old adage: "An apple a day keeps the doctor away," is more poetic than correct; but about three apples a day is sufficient to counteract the acid-forming tendency of the grains in various forms that we take in during the day—cereals in the form of porridge, bread, etc.

Most people have some sort of porridge for breakfast, with fish or eggs to follow, with muffins or toast, all acid-formers.

Perhaps meat or fish, or a lobster salad, or a ham-and-egg sandwich, forms the average luncheon. All acid-forming.

For dinner we serve roast lamb with peas, beef or bacon with beans or rice, completing the meal with a custard, or a pudding—all hopelessly acid-forming, with no balance except, maybe, a cup of coffee and a cigar.

Is it any wonder that, after days and weeks of such a regimen the insulted body protests? Is it any wonder that we find ourselves taking cold easily, or suffering rheumatic or neuralgic pains, or a bilious attack, or struggling with "that all-gone feeling?"

As it is considered impossible to become hyper-alkaline, or that if it were possible for any ill results to follow, why not see to it that enough alkali-forming food is taken during the day to balance the acids—for instance, grape-fruit or apples after breakfast, etc.?

Things and conditions other than food produce acidosis—anger, for instance; lack of fresh air and exercise; fear, worry, anxiety; all the unwholesome emotions. Foods will have no effect while we are controlled by these emotions.

Mineral foods are essential. The body requires calcium; it builds and repairs the bony structure, and maintains a correct balance between various forces that operate within the body. It is to be had in its best form in milk, buttermilk, and sour milk. Cheese, eggs, beans, almonds and whole grains. Meats are very poor in calcium. Carnivorous animals must eat bones in order to get what they need.

Phosphorus is another of the required minerals. It builds brain "nerve," and other tissues that are necessary for the conduct of nerve-stimulus to its end-point. We find it in hard cheese, beans, peas, whole grains, meat, fish, eggs, almonds, peanuts, walnuts, figs and raisins. Apples, oranges and the other fresh juicy fruits, contain almost none of it; the same is true of white flour, polished rice, cabbage, lettuce and most of the other vegetables. In an analysis of the average dietary of 150 well-to-do American families, it was found that almost one-third of them were dangerously deficient in phosphorus.

The body also requires potassium, sulphur, sodium, chlorine, magnesium, iodine, silicon, fluorine and iron. It is safe to take for granted that all of these will be supplied by the ordinary diet except

IRON, which is one of the most important of all, and must be supplied in the food. If the diet is deficient in phosphorus or calcium, the bones and teeth will be attacked and consumed to a greater or lesser extent to supply the need; but there is no such reservoir of iron in the body. It must be supplied, and should be taken at every meal.

Most of the iron in the body is used in the red-blood cells, which act as carriers of oxygen. Their work wears them out rapidly, and iron must be supplied to rebuild them. If lacking, a condition of anemia more or less pronounced, is the result. No need to discuss the other functions of iron. Lacking in the blood, you will not be interested in the others for very long. The best source of iron is spinach and other greens, eggs, especially the yolk; beans, peas, oatmeal, whole wheat, figs, raisins, dates, etc. Milk contains very little; so do the root vegetables, most fruits, polished rice, white flour, etc. Meats contain it, but not in available form.

Do not take anything for granted. Eat the foods that you know contain the elements essential to health and efficiency.

There is no question in my mind that a very little thoughtful intelligence devoted to the selection of foods will bring about a condition of health and efficiency that will justify an evening devoted to this rather prosaic subject.

Below will be found a classification of foods as to acids, alkalins, and minerals that may be useful to those who wish to make practical application of the matters presented.

ACID-FORMING FOODS

Meats	Eggs
Poultry	Nuts
Fish	Legumes
Visceral Foods	All High Protein Foods
Animal Fats except Cream and Butter	
All Cereal Grains and their Products	

ALKALI-FORMING FOODS

All Fruits, fresh and dried, except—
 Prunes, Plums and Cranberries.
 All Vegetables, fresh or dehydrated, except—
 Legumes.
 Milk, all forms—especially Buttermilk, Clabber,
 Sour Milk and their Products.
 Citrous Fruits are particularly high in Alkali-forming qualities.

MINERAL-YIELDING FOODS

Milk.	Cheese.	Eggs.	Beans.
Peas.	Almonds.	Whole Wheat.	Other Grains.

These are Calcium foods. Build bone, teeth, etc., and help to maintain the electrical or magnetic equilibrium of the body.

Hard Cheese.	Legumes.	Whole Grains.	Meats.
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Poultry.	Fish.	Eggs.	Almonds.
Peanuts.	Walnuts.	Figs.	Raisins.
Dates.			

Phosphorus foods. "Without Phosphorus there is no thought."

Supply conduit for nerve stimulus. If not supplied in foods, body takes phosphorus from bones, teeth, etc.

Spinach and all "Greens"	Yolks of Eggs	Figs
All Leafy Tops of Vegetables	Legumes	Raisins
Whole Wheat and other Grains	Oat Meal	Dates

Iron Foods. Build red-blood cells. Must be supplied in foods.
No reservoir in body from which they may be drawn.

Snapshots at the East A Mysterious Disappearance An Oriental Tale

The night of our arrival in Jerusalem a mysterious disappearance occurred. Three-fifths of our party consisted of clergymen. There were a thousand Sky-Pilots gathered together in that distant city upon this particular occasion. But the clergymen did not disappear. On the contrary they were ubiquitous. You met ministers on the street and in the bazars; you ran across them at the mosques and at the Jews' Wailing Place; you passed them along the Via Dolorosa and around the Temple area; you met them just emerging with blinking eyes from Solomon's Quarries or circumnavigating the Walls of Jerusalem astride the sad-faced donkey; you encountered them at the Mount of Olives, on Mount Zion or Moriah, and in the Mosque of Omar; you beheld them at Gethsemane, or gazing upon GOLGOTHA; you encountered them at the Church of the Holy Sepulchre or Gordon's Tomb; there were clergymen everywhere. The very air seemed to be impregnated with an ecclesiastical tang.

We merely mention this fact as a coincidence,—not a logical sequence: Strange to say all the chickens in Jerusalem and the surrounding villages disappeared upon the night of the Dominies' arrival. So it was declared by solemn affirmations. The perpetrators of this fowl deed were never found out. Suffice it to say that upon the days following the clergymen dined sumptuously upon chicken.

A suspicion has always lingered in our minds since then, that by surreptitious processes,—known best to the adepts in the art of fowling, that this mysterious disappearance was accomplished by midnight raiders whom we will not name. The presence of some dusky-hued Divines gave color to this suspicion.

We opine that by the process of metempsychosis familiarly known as the act of mastication, insalivation, deglutition, digestion and assimilation that these chickens were transformed into PARSONS. Conversely, persons assume the nature of the animal they eat most freely.

Of course it may be a dream occasioned by eating too much chicken in Jerusalem but there persistently arises before our vision, the apparition of a rooster dressed up in broadcloth, with a white cravat, patent leather pumps, and gold-rimmed spectacles, standing up in the pulpit of a church, flopping his wings while he crows lustily over a carefully prepared manuscript.

Take Warning! Look out you don't turn into a Quack! Quack! Gobble! Gobble! Gobble! Honk! Honk! Honk! Honk! If metempsychosis is true you may wear feathers instead of broadcloth.—In The Sweet Bye And Bye.

WISHING YOU A MERRY XMAS AND A HAPPY NEW YEAR

Very truly,
ALPHONSO IRWIN, D.D.S.

425 Cooper St.,
Camden, N. J.

DIRECTORY OF STATE SOCIETIES FOR 1921-1922

(Will society officials kindly send additional dates and corrections?)

Alabama—Birmingham, April 11, 12, 13, 1922.

President: F. F. Perry, Montgomery.

Treasurer: Geo. C. Bledsoe, Cullman.

Secretary: S. B. Hopkins, Greenville.

Alaska—

President: E. F. Germain, Anchorage.

Secretary and Treasurer: L. S. Keller, Skagway.

Arizona—Phoenix, November 10, 1921.

President: W. D. Shackelford, W. Adams St., Phoenix.

Secretary and Treasurer: J. C. Roberts, 44 N. 1st Ave., Phoenix.

Arkansas—Little Rock, Mar. 20, 21, 22, 1922.

President: C. U. Mayfield, Pine Bluff.

Secretary and Treasurer: W. F. Williams, Urquhart Bldg., Little Rock.

Southern California—Los Angeles, June, 1922.

President: R. C. Lane, Story Bldg., Los Angeles.

Treasurer: C. C. Noble, Wright-Collander Bldg., Los Angeles.

Secretary: Bert Boyd, 1010 Story Bldg., Los Angeles.

California State—

President: J. Camp Dean, Dalziel Bldg., Oakland.

Treasurer: Robert E. Keys, 391 Sutter St., San Francisco.

Secretary: B. Frank Gray, 909 Hyde St., San Francisco.

Colorado—June, 1922.

President: W. A. DeBerry, National Bank, Colorado Springs.

Treasurer: William Smedley, Sr., 604 California Bldg., Denver.

Secretary: H. W. Wilson 604 Metropolitan Bldg., Denver

Connecticut—New Haven, April 20, 21, 22.

President: Morton J. Loeb, 241 Orange, New Haven.

Treasurer: Ralph H. Keeler, Manwaring Bldg., New Haven.

Secretary: Clesson Gibbs, 886 Main St., Bridgeport.

Delaware—Wilmington, Sept. 14, 1922.

President: W. E. Harris, 211 W. 10th St. Wilmington.

Treasurer: P. A. Traynor, 807 Washington St., Wilmington.

Secretary: E. F. Cullen, 200 Ford Bldg., Wilmington.

District of Columbia—Washington, D. C., October.

President: Carl J. Mess, Braddock Heights, Alexandria, Va.

Treasurer: M. F. Finley, 1928 I St., N., Washington, D. C.

Secretary: W. M. Simkins, 720 Woodward Bldg., Washington, D. C.

Florida—

President: G. B. Tison, Gainesville, Fla.

Secretary and Treasurer: H. B. Pattishall, 332 St. James Bldg., Jacksonville.

Georgia—Augusta, June 14, 15, 16, 1922.

President: A. P. Gordy, Masonic Temple, Columbus.

Treasurer: S. R. Atkinson, Jr., Candler Bldg., Atlanta.

Secretary: J. R. Mitchell, Candler Bldg. Atlanta.

Hawaiian Islands—Honolulu, December 2.

President: J. M. Whitney, Boston Bldg., Honolulu.

Treasurer: C. B. High, Young Bldg., Honolulu.

Secretary: J. H. Waddell, Boston Bldg., Honolulu.

Idaho—Pocatello.

President: B. H. Hudson, Blackfoot.

Treasurer: Wm. Ludden, St. Anthony.

Secretary: M. J. Goode, Filer.

Illinois—Springfield, May 9, 10, 11, 1922.

President: F. B. Noyes, Peoples Gas Bldg., Chicago.

Treasurer: T. L. Grisamore, 29 E. Madison St., Chicago.

Secretary: Arthur G. Smith, 511 Central Nat. Bldg., Peoria.

Indiana—Indianapolis, May 15, 16, 17, 18.

President: C. R. Jackson, 907 Hume Mansur Bldg. Indianapolis.

Treasurer: C. C. Priest, Marion

Secretary: A. J. Kimm, 704-5 Citizens Bank Bldg., Evansville.

Iowa—Des Moines, May 2, 3, 4, 1922.

President: Clarence V. Watts, 315 K. P. Block, Des Moines.

Treasurer: Frank Fourt, Fairfield.

Secretary: Earle C. Smith, 635 So. Governor St., Iowa City.

Kansas—Kansas City, March, 1922.

President: J. F. Keman, Sweetser Bldg., Wichita.

Treasurer: E. C. Glass, Independence.

Secretary: C. K. Weaver, Clay Center.

Kentucky—Louisville, April 10, 11, 12, 1922.

President: E. B. Hardin, Madisonville.

Treasurer: R. L. Spratt, Mt. Sterling.

Secretary: W. M. Randall, 1035 2nd St., Louisville.

Louisiana—Shreveport, May or June.

President: L. Dempsey, 943 Jackson Ave., New Orleans.

Treasurer: O. J. Ory, Garyville.

Secretary: Fred Ratzburg, Shreveport.

Maine—

President: Edward A. Sheehy, Rumford.

Secretary: B. C. Graffam, 655 Congress St., Portland.

Treasurer: I. E. Pendleton, Pine St., Lewiston.

Maryland—Baltimore.

President: B. L. Brum, 827 Park Ave., Baltimore.

Treasurer: H. A. Wilson, Calvert Bank Bldg., Baltimore.

Secretary: J. H. Ferguson, Jr., 914 N. Charles St., Baltimore.

Massachusetts—Worcester, May 3, 4, 5, 1922.

President: Frank P. Barnard, 507 Main St., Worcester.

Treasurer: J. T. Paul, 419 Boylston St., Boston.

Secretary: W. Vernon Ryder, 175 Newbury St., Boston.

Michigan—Detroit, April.

President: R. W. Bunting, Ann Arbor.

Treasurer: E. J. Chamberlain, 519 Ashton Bldg., Grand Rapids.

Secretary: Wm. A. Cook, 1853 David Whitney Bldg., Detroit.

Minnesota—Minneapolis, February, 1922.

President: Max E. Ernst, Lawry Bldg., St. Paul.
 Treasurer: T. D. Abernathy, Dental Bldg., Rochester.
 Secretary: C. H. Turnquist, 338 LaSalle Bldg., Minneapolis.

Mississippi—Meridian, April.

President: J. E. Hargis, Oxford.
 Treasurer: C. K. Bailey, Grenada.
 Secretary: W. F. Beavers, Meridian.

Missouri—Kansas City, April, 1922.

President: Edw. M. Hall, Shuckert Bldg., Kansas City.
 Treasurer: J. F. McLellan, Moberly.
 Secretary: H. C. Pollock, 723 Metropolitan Bldg., St. Louis.

Montana—Helena.

President: C. H. Head, Helena.
 Secretary and Treasurer: J. E. Baker, Great Falls.

National Capital—George Washington University, October.

President: John E. Black, 825 Vermont Ave., Washington, D. C.
 Treasurer: F. I. Bartlett, 1225 New York Ave., Washington, D. C.
 Secretary: C. Willard Camalier, 921 15th St., N. W., Washington, D. C.

Nebraska—Lincoln, May, 1922.

President: H. E. King, 546 Peters Trust Bldg., Omaha.
 Treasurer: E. W. Fellers, Beatrice.
 Secretary: G. H. Grubb, Ganter Blk., Lincoln.

New Hampshire—

President: B. H. Goodwin, Enfield.
 Treasurer: Wm. A. Young, 40 N. Main St., Concord.
 Secretary: L. I. Moulton, 15 N. Main St., Concord.

New Jersey—

President: W. W. Hodges, Raritan Bldg., Perth Amboy.
 Treasurer: Chas. Faupel, 484 Bergen Ave., Jersey City.
 Secretary: F. K. Heazelton, 223 E. Hanover St., Trenton.

New Mexico—Albuquerque.

President: C. H. Woolgar, Magdalena.
 Secretary and Treasurer: D. P. Nolting, Albuquerque.

New York—

President: B. S. Hert, C. of C. Bldg., Rochester.
 Secretary: A. P. Burkhart, 52 Genesee St., Auburn.
 Treasurer: G. H. Butler, University Bldg., Syracuse.

North Carolina—Wrightsville Beach, June.

President: W. M. Robey, Charlotte.
 Treasurer: R. M. Morrow, Burlington.
 Secretary: H. O. Lineberger, Raleigh.

North Dakota—Fargo, May, 1922.

President: T. E. Barber, Grand Forks.
 Treasurer: J. H. Wells, Harvey.
 Secretary: Solon Crum, Fargo.

Oklahoma—

President: A. B. Walker, Fairview.
 Secretary: Frank C. Reisling, 606 New Wright Bldg., Tulsa.
 Treasurer: T. W. Sorrels, Colcord Bldg., Oklahoma City.

Oregon—

President: Clyde Mount, Oregon City.
 Treasurer: F. E. Gulick, Morgan Bldg., Portland.
 Secretary: W. C. Shearer, 412 Stevens Bldg., Portland.

Pennsylvania—Pittsburg, April 11, 12, 13

President: John F. Biddle, 517 Arch St., Pittsburg.
 Secretary: W. L. Fickes, 6004 Penn. Ave., Pittsburg.
 Treasurer: A. B. Miller, 299 Wyoming Ave., Kingston.

Rhode Island—Providence, October.

President: Wm. R. Burke, 171 Westminster St., Providence.
 Treasurer: Howard W. Church, Bristol.
 Secretary: Ambrose H. Lynch, 511 Westminster St., Providence.

South Carolina—Georgetown, May, 1922.

President: W. C. Milhous, Barnwell.
 Treasurer: A. H. Corley, Edgefield.
 Secretary: E. C. Dye, Greenville.

South Dakota—Sioux Falls, March, 1922.

President: R. H. Fouser, Salem.
 Treasurer: Ferdinand Brown, Sioux Falls.
 Secretary: Ernest W. Elmen, Sioux Falls.

Tennessee—Memphis, May 8, 9, 10, 11, 1922.

President: G. L. Powers, Memphis.
 Secretary and Treasurer: J. Minor, Doctors Bldg., Nashville.

Texas—Houston.

President: W. D. McCarty, Moore Bldg., San Antonio.
 Secretary and Treasurer: J. G. Fife, 736 Wilson Bldg., Dallas.

Utah—Salt Lake City, June 19-24, 1922.

President: R. L. Watson, Judge Bldg., Salt Lake City.
 Secretary and Treasurer: E. W. Browning, Ogden.

Vermont—Rutland, March 15, 16, 17, 1922.

President: G. M. Somers, Proctor.
 Treasurer: Thomas Mound, Rutland.
 Secretary: Carter R. Woods, Rutland.

Virginia—Richmond, October.

President: M. B. Rudd, Chamber of Commerce Bldg., Richmond.
 Treasurer: W. N. Hodgkin, Warenton.
 Secretary: Harry Bear, 410 Professional Bldg, Richmond

Washington—Seattle, July, 1922

President: L. B. Manchester, Wanatchee.
 Secretary and Treasurer: W B Power, Cobb Bldg, Seattle

West Virginia—Fairmont, April 10, 11, 12, 1922

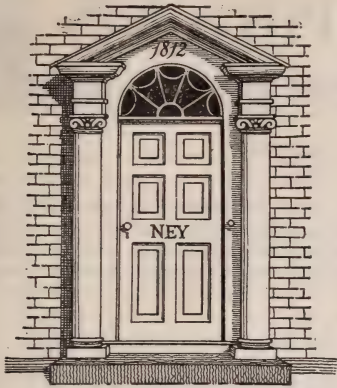
President: W. S. Rosenheim, Williamson.
 Treasurer: J. S. Stone, Clarksburg.
 Secretary: N. P. MacDermid, Capital St., Charleston.

Wisconsin—Milwaukee, July 11, 12, 13, 1922.

President: E. C. Oviatt, Columbus.
 Treasurer: A. Gropper, 616 Goldsmith Bldg Milwaukee.
 Secretary: R. W. Huegel, 104 King St., Madison

Wyoming—Sheridan, June 20, 21, 22, 1922.

President: I. P. Hayes, Sheridan.
 Treasurer: Peter Appel, Jr., Cheyenne.
 Secretary: E. C. Andrew, Cheyenne.



Firm Foundations

*The
Superstructure
isn't all.*

What's underneath?

A few years ago The Ney Company moved from its old building on Asylum Street, Hartford, to its new building on Elm Street—a plant constructed with the purpose of giving greater facilities for caring for an ever-increasing business.

Recently, the old building was torn down to make way for a new street that was being opened. All went well until the workmen reached the foundations of the old vaults—then the work of demolition halted. It was discovered that those foundations went down into the earth eighteen feet and were as solid as New England granite. They were constructed to last through generations.

We have endeavored to build this business on similar foundations—to serve the generations as they come to the limit of our capacity. Continuing service and mutual confidence are implied, we think, in our slogan

“Best Since 1812”

IF YOUR DEALER CANNOT SUPPLY ANY ARTICLE OF OUR MANUFACTURE, WRITE TO US

THE PIONEER  THE LATE JOHN M. NEY	The J. M. NEY COMPANY FOUNDED IN 1812  President HARTFORD CONNECTICUT, U.S.A.	NEW GOLD FOR  PRECIOUS METAL PRODUCTS OLD GOLD, SILVER PLATINUM ETC.
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NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

A judge over in Germany has ruled that a dentist may advertise to extract teeth by the "most painless method," without violating a law that prohibits advertising "painless dentistry." The use of the word "most" implies that there shall be some pain. The same dentist advertises that he will supply artificial dentures at five marks per tooth—about two cents in real money! And he proved that he was doing it. The case against him was dismissed.

One Max Hans Martin, recently a dentist at Evansville, Ind., is now apparently a man without a country. He came to America in 1888; was naturalized in 1905; returned to Germany in 1907, where he has remained, although regarded there as an alien. The U. S. Government recently brought suit to cancel his citizenship. He returned from Germany to contest the suit, which has been decided against him, on the ground that the only country he cares anything about is the one in which he can make the most money. He said, at the trial, that he can make more money in Germany now than he can in America, and purposes staying there while that is the case.

Rumors were current during December that a merger of the Ohio College of Dental Surgery with the University of Cincinnati was on the tapis. Nothing definite had been given out at the date of this writing. The dental college is 76 years old, the second oldest of its kind in America.

The Chicago Dental Society now numbers 2,000 members.

A movement said to have originated in Indianapolis is sweeping over the country having for its purpose the organization of dental and medical credit bureaus with the object in view to limit bad accounts and look after their collection. With such an organization working properly it would be exceedingly difficult for a dead-beat to "sting" any member, and he certainly would be prevented from beating more than one member. It is a good thing and should be encouraged. Many a dentist would be on easy-street today were it not for his uncollected and probably now uncollectible accounts.

Rosalind M. Clark, Cleveland, only woman who took State Board exam. in October, headed the list of applicants who were given licenses. Mildred Gillsdorf, Chillicothe, first woman granted a license to practice oral hygiene in Ohio, under the law passed last session.

Down in West Virginia Dr. Epling and his corps of assistants are busy establishing free dental clinics for public school children. Every child in every school is to have his teeth put into first-class condition and kept there.

By invitation, of course, I went over to Western Reserve January 17, and talked to the dental college boys on my favorite topic—one of them, anyhow:

"The Dentist and His Dollar." Had a fine audience, very receptive and appreciative. Was paid the most sincere compliment in my experience by one of my auditors. When I had been talking exactly 70 minutes, by the watch—and was about half done—in a sort of apologetic way I asked: "How long have I been talking? Are you tired? Shall I stop?" From about the middle of the audience came a deep baritone voice under full head of steam: "About five minutes; go on." And I went on, for about another hour. Seems to me nothing could have been more genuine or spontaneous.

This sort of thing should be a part of the regular program in every dental college in America during the entire course—at least during the senior year. Of course, my talk was purely elementary, dealing with fundamental general principles. Business should be presented in detail, step by step. From many conversations with practitioners who have been at the chair for many years, I am satisfied that the average dentist leaves college with no more knowledge of business than the average boy of ten or fifteen; and the trouble is that he thinks he knows a lot. Many dentists have told me that my stuff would have saved them thousands of dollars and years of time if they could have had it at college. Every student in colleges now may have it, if his Faculty could be brought to an understanding of its importance.

Here's a suggestion from a dentist:

"For canker sores, vulcanite galls and soft, soggy tissues, apply Martin's Cream a few times, and dispense Dentaline for home use. This removes the trouble like magic, and if the use of Dentaline is continued, it will not return."

Try this and let me know how it works.

Drs. Marcus L. Ward, Ann Arbor; F. C. Waite, Western Reserve; and Henry Banzhaf, Marquette, have been appointed a committee of three to revise the minimum requirements of Class A dental colleges.

The next meeting of the West Virginia State Society will be held at Fairmount, April 10, 11 and 12. The program is practically completed.

There isn't very much to write about this month; but the professional departments are crammed with good things. The surplus in Dr. Bethel's section will more than balance any deficiency you may find in mine. Don't you think we are giving the profession just about the limit in magazine goodness?

What the Schrader Instrument Company, Independence, Iowa, Says for Itself

This company came into existence about four years ago, when Dr. Schrader designed his pyorrhoea instruments. Expert steel workers are employed in this modern factory, and each instrument receives most careful attention. The policy of the company is to turn out the best product that is within its power to manufacture. New products are always tried out in office practice before they are placed on the market.

The articles manufactured are the Schrader Pyorrhoea Instruments, consisting of a small set of twelve, for the dentist that does not do a great deal of Pyorrhoea and Prophylactic treatment, and the large set of forty, designed to handle cases quickly and efficiently. A great feature of this set is that they are numbered, and the book of instructions and the chart make it possible for the beginner to use the right instrument in the right place and without loss of time.

Other articles manufactured are the Non-Splash Guard, used for polishing on the laboratory lathe, to prevent debris from flying on the clothing and in the eyes, and the stone moistener, which moistens the stone while grinding in the mouth.

Dr. J. K. Cunningham, Princeton, Ind., put an end to the career of one of the smoothest and most successful dental burglars that ever annoyed the profession when, on the morning of December 19, he shot and possibly fatally wounded a man who has been identified as Paul A. Stockel, of New York, supposed to be buyer for a large jewelry firm, and who is now lying in a hospital at Princeton. Dr. Cunningham lives back of his offices. On going out into the hall on the morning in question he saw a man trying to jimmy the lock on his office door. On being interrupted, the Doctor says the man rushed at him with an open knife, when he drew his pistol and fired at close range. Several hundred dollars' worth of dental gold was found in a grip said to be the property of Stockel. It is said that the wounded man admits robbing an office at Columbus, Ind.

Syracuse, Albany, Schenectady and Troy dentists have agreed upon a minimum fee for operations. May be a good move.

Dr. J. A. Marshall, associate professor of biochemistry and dental pathology, university of California, is authority for the statement that radium offers encouraging possibilities in the treatment of chronic dental abscesses. Many root-canals have been so treated in an experimental way, with success in every instance except, possibly, one solitary case. These experiments will be watched with great interest by the entire profession.

Dr. T. W. Bass, Broken Bow, Neb., is making a complete set of dentures for the oldest man in the state, Mr. Peter Starr, aged 103. The old gentleman is still quite active, and expects to wear out one or more "sets" before he finishes.

DEATHS

At Reading, Pa., December 14, Dr. Jacob F. Kinsey, aged 80.

At Haverford, Pa., December 22, Dr. Henry C. Register, aged 77. He was widely known as a writer, and an inventor of dental appliances.

At Pottstown, Pa., December 15, Dr. Samuel L. Bower, aged 49.

At Stamford, Conn., December 10, Dr. Frederick C. Lambert, aged 38.

At Womelsdorf, Pa., December 10, Dr. Henry B. Hamaker, aged 79.

At Binghamton, N. Y., December 20, Dr. Warren M. Sharp, aged 58. Dr. Sharp had an international reputation as the inventor and patentee of seventeen different dental appliances, made and sold under his name.

At Marblehead, Mass., Dec. 18, Dr. Phillip H. Beach, aged 78.

At Conneautville, Pa., December 17, Dr. C. E. Townley, aged 55.

At Brooklyn, N. Y., December 17, Dr. August Grosch, aged 73.

At Boston, Mass., (Newton Center), Dr. Robert Ferguson Hayden, aged 43.

At Savannah, Ga., December 29, Dr. Samuel Madison Roach, aged 71.

At London, Ont., Canada, December 27, Dr. H. R. Abbott, aged 67.

At Belleflower, Ohio, December 23, Dr. Frank B. Parrish, aged 40.

At Greenwich, Conn., December 31, Dr. Christopher L. Crocker, aged 68.

At New York City, December 31 Dr. Michael Cunningham, aged 49.

At Springfield, Ohio, December 30, Dr. Carl Uhle, aged 44.

At Yonkers, N. Y., January 4, Dr. William H. Taylor, aged about 36.

At Cincinnati, January 6, Dr. Clarence F. Williams, of Terre Haute, Ind., aged about 55.

On a train between his home at Mineola and New York City, where he had his office, January 6, Dr. George Brockway, aged 60.

At Birmingham, Ala., January 7, Dr. J. L. Sandefur, aged 55.

Reads like old times: "Dr. Corydon Palmer, with offices at Long Island City, has recently purchased a home," etc. From a New York daily. That is a name that shouldn't be allowed to die out in dentistry.

Dredging in Niagara river above the Falls, workmen brought up a prehistoric tooth three feet long and a foot thick, in good state of preservation. From that single tooth probably will be reconstructed the entire skeleton of some long-extinct animal, who must have had a lovely time hunting for a dentist.



“Oh Doctor -
I’ve broken
my Denture!

—you can repair it
immediately—can’t you?”

THIS question is often one of the most aggravating incidents in a “hectic” day. With a patient in your chair and your appointment book full, the anxious voice of one of your “best patients” who is going to a reception at 4 o’clock is apt to take the joy out of your work.

Of course when you have made *duplicate* dentures for your patients such emergencies are provided for—there is no “rush,” no disappointments nor misunderstandings such as often arise due to the strained nerves of all concerned—so we suggest *two* sets of *dentures*.

Trubyte

—the Dentures that are worth duplicating

If you will make a point of suggesting a second Trubyte denture for every patient, you will be surprised and gratified by the result. Most people have two or more pairs of glasses to avoid inconvenience in emergencies, and it is comparatively easy to convince your patients of the advantages in having duplicate dentures.

Until accidents are forever eliminated from human activities, there is need for insurance against the consequences.

Discourage the use of the old, loose fitting monstrosity that some patients keep (when they have new dentures made) “to fall back on”—they belong to the past—*they’re pre-Trubyte!*

Duplicate Trubyte dentures make and hold friends for you because they eliminate the consequences of accidents with their eleventh hour rush and frayed nerves, or exasperated patients who expect miracles or magic to save them from embarrassment.

RESTORATIONS  THAT RESTORE

Your Dealer or Direct

The DENTISTS' SUPPLY COMPANY

220 West 42nd Street

New York City

What "Jelenko" Says of Certain Products

Jelenko's Plastic Gold Solder is solder finely pulverized (in which the flux has been incorporated by a special process)—all ready for instant use. It is indicated for delicate soldering where the use of regular solder is difficult, such as soldering the tail piece to a clasp, tacking a band to a cusp, soldering fine gold wire mesh to gold plate in rebasing gold dentures, for soldering points of contact on fine orthodontia appliances, etc. It also makes an excellent flux or leader to put in places where it is difficult to flow ordinary solder.

The technic of Jelenko's Plastic Solder is simple. With a pointed instrument that has been warmed in the flame, apply a very small amount of the Plastic Solder to the points of contact which are then gripped or clamped together. Then play the Bunsen Burner or alcohol flame to the part or parts to be soldered and presto! a strong union is made. As many as two or three points can be soldered in one operation.

Jelenko's Plastic Gold Solder is put up in 2 dwts. jars in 18, 20 and 22.

J. F. Jelenko & Company, No. 1 Union Square, New York, U. S. A., will be glad to send circular on request.

I notice reports of activities of various Women's Auxiliaries to dental societies at widely scattered places; and I wonder why every society does not organize such an auxiliary. There is plenty of work to be done, and the women are particularly adapted for much of it.

Dr. John J. Tigert, commissioner of education, announces that the fifth annual conference on physical education would be held at Chicago, February 28. Thirty-five organizations throughout the country which are interested in physical education will be represented at the conference, according to the commissioner. Matters for discussion includes the nation-wide extension of a modern program of physical education. Dr. Willard S. Small of the United States bureau of education will preside.

There might be more speed in getting back to normalcy if we felt sure the boys would all be there to receive us in the same old way.

Modern American statesmanship needs a diet of old fashioned vitamins for its constitution.



ASCHER'S ARTIFICIAL ENAMEL "IMPROVED 1920"

Superior to Any Other Tooth Filling

Free Samples of IMPROVED ASCHERS POWDER and LIQUID furnished by Dental Supply Houses.

SPECIAL INTRODUCTORY OFFER:

On receipt of One Dollar, we will send you by Insured Parcel Post, Charges Prepaid, an extra Large Sample Bottle of IMPROVED ASCHERS POWDER and LIQUID, any color demanded, DIRECTIONS for Use, Price List, etc.

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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

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No. 3

DIAGNOSIS OF GINGIVAL LESIONS AND APICAL INFECTIONS DIFFERENTIATING BETWEEN SALVABLE AND UNSALVABLE TEETH.*

BY THOMAS P. HINMAN, D.D.S., ATLANTA, GEORGIA.

THE TIME HAS COME in the practice of dentistry when some one should take a firm stand against the ruthless and criminal sacrifice of functioning teeth "on suspicion," and condemn this practice in no uncertain terms. Thousands of teeth have been and are being sacrificed on suspicion that they are the etiological factor in systemic derangement; yet, in a large number of cases, after the loss of such teeth, the patient shows no appreciable improvement. In fact, many patients are in a much more deplorable condition after the loss of their teeth than they were before because of the permanent injury to their masticating apparatus. The loss of a functioning tooth is a serious thing; and until it is absolutely determined that it is impossible to restore infected teeth to such condition that they will no longer be a menace to health, they should not be extracted. That such a procedure is possible can be clearly shown.

The condemnation of all pulpless teeth is the *greatest error ever advocated in dental practice* and falls in the same category as the old "Arthur" method of filing and grinding the teeth out of proximal contact on the theory that teeth not in contact do not decay. Many of the older practitioners here remember seeing the awful condition of mouths so treated.

The advent of the X-ray in dental practice,—while giving us an additional means to be used as a factor in diagnosis, has been a source of danger and a partial cause in the needless sacrifice of many teeth. In the hands of the inexperienced diagnostician, the X-ray picture is the companion-piece to the sword of Damocles, as every shadow shown on the picture is, in these minds, a sword hanging over the head of the patient which may, at any time, fall and cause permanent injury or death.

I am afraid, if many more X-ray equipments are put into the hands of the inexperienced, that the practice of dentistry will degenerate into the extraction or teeth only and the making of artificial dentures. To hear the "hundred per cent" talk, you wonder why the human race has not

*Read before the Tennessee State Dental Association, May, 1921.

become extinct from causes due solely to the frightful menace of teeth. Let me warn these radical men that the day is coming, and is not far distant, when an accounting will have to be made for this feature of malpractice,—for such I firmly believe it to be. If we are to make diagnosis using an X-ray picture as the sole means of determining the condition of the suspicious tooth, we are hobbling on a crutch, and a very poor one. On the other hand, I do not want to minimize the importance of a good X-ray picture as a factor in diagnosis, because it is a factor and a most important one; but as a sole means it is decidedly deficient.

Let us for a moment refresh our memories about the anatomy and histology of the structures composing and supporting the teeth. I will discuss only those structures which play an important part in the field of infection:



Cases after treatments and root filling where there was no destruction of apical cementum.



Fig. 1

Fig. 1.—Apex rarefied. Incurable.

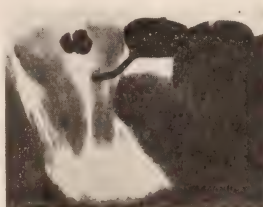


Fig. 2

Fig. 2.—Apex destroyed. * Cystic. Incurable.



Fig. 3

Fig. 3.—Showing rarefaction of apical cementum. Incurable.

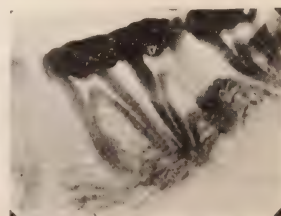
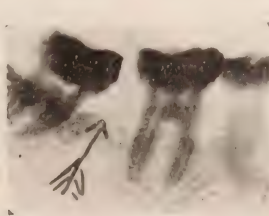


Fig. 4

Fig. 4.—Pyorrhea, showing condensing osteitis of alveolar process.

The dentin receives its support from the pulp; the cementum receives its support from the periodontal ligament; therefore, we see that when the pulp is removed from a tooth only the dentin is affected. The portion of the

tooth composed of cementum is still alive, and so there is no such thing in the mouth as a dead or devital tooth, but only a pulpless tooth. The dentist has been responsible for the erroneous idea that teeth from which the pulps have been removed are dead; therefore, our medical friends have taken up the idea that such *dead* teeth should be removed, for any dead thing in the body is necessarily a menace to health. Let us be more careful in our nomenclature and stop calling pulpless teeth "dead" or "devital."

Another diagnosis point of marked importance is the *lamina dura* which lines the socket in the alveolar process and to which is attached the periodontal ligament. Particular and careful attention should be given to this for any break in its continuity is viewed with suspicion; and yet there are many teeth which show an apical break,—radio-lucent area,—in which the bone is not affected apically, as this break may be caused by mal-occlusion due to the tooth in question carrying a crown or filling that is too long. Or, perhaps it is subject to undue stress from being used as an abutment, carrying a bridge pier, the break showing although the tooth may be vital. It must be borne in mind that the X-ray does not show infection but may show the results of infection; that is, bone destruction.

Another structure which may be mentioned is the spongiosum,—that portion of the bone which lies between the lamellae. The tooth, under normal conditions, does not come in contact with this portion of the bone. However, the spongiosum is infiltrated far into its substance by the destruction caused from osteitis of the rarefying type. This type of osteitis, as shown by the X-ray picture, is an indication that the resistance of the patient is below par and the bone is not resisting infection. On the other hand, condensing osteitis, clearly shown by the definite border of condensed bone around the periphery of the radio-lucent area, indicates that the bone is resisting invasion and is setting up a wall to prevent further penetration and destruction. Condensing osteitis is an indication that the resistance of the patient is high and the chances of success in treatment are magnified. In the apical cementum, the same condition prevails; that is, rarefying and condensing cementosis.

Any rarefaction of the cementum is fatal to the tooth, and such tooth should be properly condemned. When the cementum is enlarged by the depositing of successive layers and the root-end is also enlarged, the chances of success through treatment are greatly increased. Nature itself is trying to close the delta of foramina so as to cut off infection, and in fact, does close many of the normal openings leading from the periodontal ligament to the pulp. Therefore, the real point in differential diagnosis is the condition of the apical cementum. This condition should be clearly shown in most instances by a well made X-ray picture.

Where the apical cementum has not been rarefied and such apical bone is only partially destroyed and the resistance of the patient is good, the tooth bids fair for treatment. That such teeth can be successfully treated and made no longer a menace to health has many times been clearly proved. This will be shown in the slides to follow.

In pictures taken of cases of pyorrhea, the condition of the surrounding bone is clearly shown, and if the disease is of the infiltrative type, the chances of success by treatment are extremely meager. All of us have experienced disappointment in treating cases of this type because after careful treatment the gingiva does not heal and the flow of pus soon returns; in fact, it is seldom stopped. This condition is clearly shown in the properly taken X-ray picture, as will also be demonstrated when the slides are shown.

Some of our operators have gone so far in the so-called removal of teeth that they are performing an operation called alveolectomy in nearly every case of tooth removal. This operation is rarely indicated and only when the sub-apical bone is largely destroyed and infiltrated and the patient's general condition one of extreme hazard. Our young men must be warned against such a radical, and in many instances, so unnecessary a procedure.

Let me ask this question of the audience: How many here present would allow done to their teeth what they are constantly recommending to their patients?

After all, if we use our God-given faculties, that is, our senses of touch and sight, depending at least partially on what we can see of the general mouth conditions and not too much on the X-ray picture, I am sure that many more teeth would be saved to be a comfort and not a menace to the patient.

Fourth Nat. Bk. Bldg.

DISCUSSION

DR. RICKS: Dr. Hinman has sounded a very important warning. Many of us have been prone to condemn teeth on an X-ray diagnosis largely, and still when the rebuilding of bone is shown we see the infection is still there. When we find these old dead teeth showing practically no root canal fillings, or poor ones, when they have been carrying an abutment of a bridge for many years, and they show no rarefaction, without doubt it is well to let them alone. Perhaps Nature has occluded that, or there may be a tying shred of pulp tissue in it, and if we go in we may make a perforation or at least introduce infection or an irritation that will result in an infection, and it is safer to let those cases alone.

Dr. Hinman has given us something definite to go by in regard to diagnoses in regard to extracting teeth, a very simple and sane one. He basis his diagnosis largely on the conditions of the cementum, and I think that is the crux of the whole situation. If a tooth is dead, Nature will exfoliate it and do it pretty promptly. Another interesting point brought out by Dr. Hinman is that Nature walls off those infections. Where we find these large radicular cysts with the well defined condensing osteitis around it, Nature's effort to protect itself against the local infection, I would like to ask the essayist if he would attempt to break out that hard bone, or peel out the granuloma or cyst, or let that alone for Nature to keep the barrier there that she has thrown up. It is said that may not supply the necessary nourishment for the healing elements. On the other hand, there is infection on the other side of that wall, and it might be well to let the wall alone.

DR. BOYD GARDNER: One thing to ask ourselves is, are these patients sick or well; have they syphilis, nephritis or what not? I would like also to ask how far do you curette the socket following the removal of a cyst or a large granuloma?

DR. W. C. GILLESPIE: Some teeth are salvable and some not. It is for us to make our diagnosis and decide as to that. There have been tremendous abuses in the extraction of teeth. Because we know certain given conditions will produce certain systemic disorders is no reason why we should extract all the teeth. We must determine whether the teeth are causing that disturbance, or some other pathology of the body. The teeth are only one of a number of organs that may produce these conditions, and if we jump at the conclusion that because the teeth in a pathological condition can produce chronic disturbances, that it is always the teeth, we are as far wrong as to think that no focal infection can produce it. We have erred on both sides. One trouble is when we look into a mouth we are apt to see what

we want to see. If we can improve by scientific study so that we can differentiate between what we actually find and what we expect to find, we shall have made a tremendous advance in the practice of dentistry.

DR. NOEL: I should like to ask Dr. Hinman's opinion of silver nitrate.

DR. CELIA RICH: Do you think it best to leave a little of the soft tissue in the apical end of the root? What is the value of leaving that tissue in the apical end of the root as a safeguard? That is Dr. Grove's suggestion.

DR. RICKS: Dr. Gardner spoke of X-raying edentulous spaces when we find granuloma or something of the sort in an edentulous space that is dangerous. We know we have extracted many teeth and have not curetted, and have left granulomas, and Nature has taken care of them. When she hasn't taken care of them, there must be some reason for that, and it is important that we clean them up. We should be very careful when the X-ray shows a large cyst or granuloma. In a recent case after I cut into the bone and took out the teeth, I removed enough of the surrounding bone to see. I saw it was deep and curetted carefully, and took it out, and in the bottom of the cavity I found something else soft and I opened it a little larger and found that was the nerve and blood vessels. Had I been careless in going in there I might have made a lot of trouble. The same thing is true with the antrum. I have always had a lot of respect for that little open space.

DR. HINMAN: (Closing) As to the walled cyst, you should remove the area of condensing osteitis. After the cyst has been removed take out the bone. I believe it is better always to break it down.

As to Dr. Gardner's suggestion, with normal patients and those suffering from different diseases, you cannot handle your cases the same. Take endocarditis cases, you must be very careful in handling them. I am speaking more of routine work. In these cases of mine it was mostly referred work.

First, clean up. When we remove a pulp, the mouth is cleaned up first. If there is a pyorrhetic condition, we take care of that first, and get the mouth cleaned up before we put the rubber dam on.

As to Dr. Grove's idea about the vital apex, I was only speaking of infected teeth. The technic is different in handling cases of that type. All pulps must be removed surgically if done properly. You cannot remove them with arsenic or any other form of caustic medicine, because it brings an area of lower type resistance at the apex. You do not want powerful stuff in the canals, and when you remove the pulp you must wait eight days before you fill the root canals. You do not want the serum forced out, but want it to take care of itself, and that tooth must be sealed up and sterily done, and let Nature heal the wound. Leave your vital apex always.

As to the silver nitrate treatment, I was speaking only of ionization. We have run the whole gamut, and we have come to this one thing that is routine. We have our orthopedic man, one of the best in the country, so interested in it that he is very enthusiastic, and we are working on an instrument for him for ionization of infected joints. That is old, of course, but they do not use the medicine we are using, Churchill's iodine. We are careful in selecting the cases. We are not going to take very sick patients. But there are cases where repair can be made. In reference to the silver nitrate preparation I can only say our success has been nil with it. I know Dr. Howe very well, and am sorry I cannot speak a good word for the silver deposit, but my experience with it has been bad.

"IT IS THE SACRED OBLIGATION

of every citizen to do his part day by day that the nation may prosper and that contentment and happiness may come to all."

Rotary Club Members

THE CUSPIDS

BY F. W. FRAHM, A.B., PH.G., D.D.S., LOS ANGELES, CALIF.

THE CUSPIDS ARE IN MANY respects the most important teeth in the two arches. Also they are the most difficult to replace or restore when injured or lost.

From an architectural standpoint they are the right and left keystones for the two arches. In ninety per cent. or more of the cases they erupt at a time when all the teeth except the third molars are in position, thus they key the teeth of the arch on each side.

From the esthetic standpoint they serve in several ways. Their position at the outer border of the incisive fossa gives force and individuality to the lower third of the face. They also impart strength and distinction to the face. If for any reason the person has lost the maxillary cuspids his facial expression will appear weak and not infrequently impart a grin or sarcastic smile to the face in spite of the patient's moods.

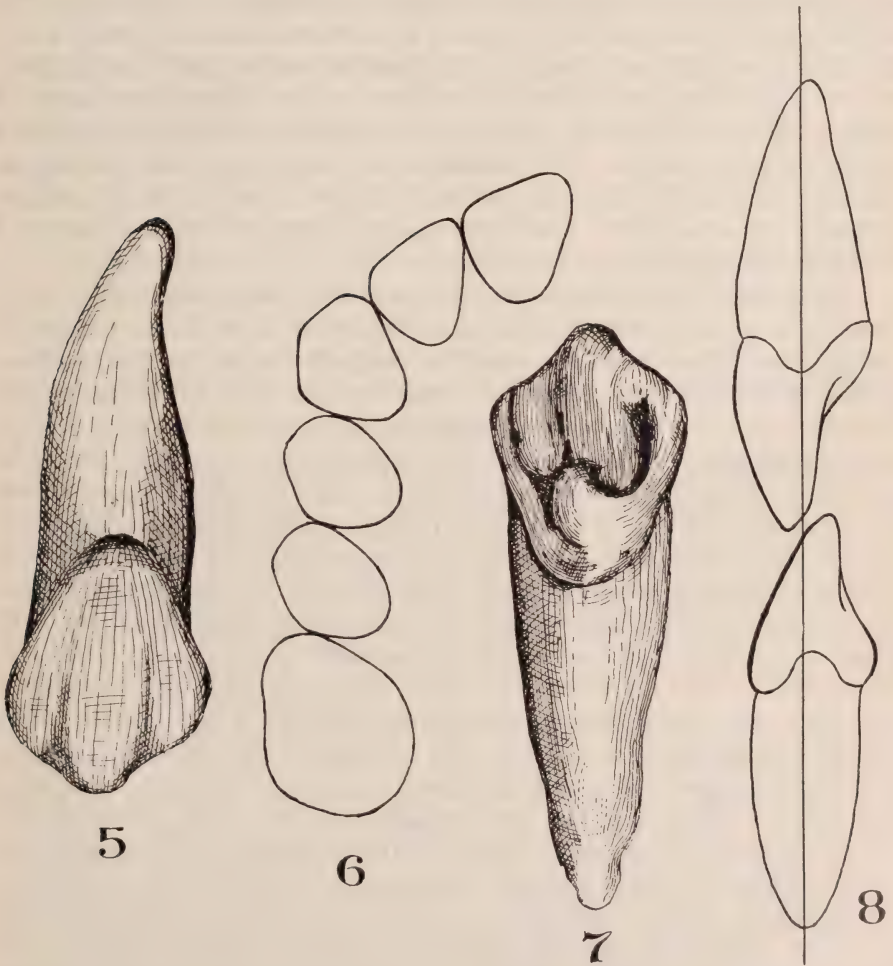
Physiologically and anatomically these teeth are very characteristic. Owing to this fact, we experience no end of trouble in making and placing them in their position in our fixed and removable work. In fact some person has said, "He could cover fifty per cent. of all our trouble in articulation with the smallest of our coins—a silver dime—by placing it over the cuspids." This may be quite true, but the writer thinks that the percentage is too low when we take into account the anatomical features and articulation of these teeth. However true this may be, if we understand the anatomy and physiology of the surfaces of these teeth our construction and articulation problems will vanish to a large extent.

MAXILLARY CUSPID

The labial surface of the maxillary cuspid presents a very strong inciso-gingival ridge which divides this surface into two unequal halves and ends in a more or less prominent cusp (*Fig. 5*). The medio-labial being smaller than the disto-labial half. It has pleased our anatomists to use this tooth to divide our labial nomenclature^{*} on tooth surface into labial and buccal surfaces. The outer surface of each tooth distal to the cuspid is named the buccal surface while the same surface of it and the teeth anterior to it is spoken of as the labial surface. The writer would like to change this nomenclature to a slight extent, by having this labial ridge of the cuspid act as the line of cleavage between the labial description and the buccal description. If the cuspids are positioned in the arch, as they should be, the portion of the labial surface medial to the ridge should be placed in alignment with the centrals and laterals and named accordingly, while the part that is distal to the ridge is placed in alignment with the bicuspid and molars and described as buccal surface of the cuspid.

^{*}The fourth of a series of articles on Crown and Bridgework being written exclusively for THE DENTAL SUMMARY.

This arrangement gives the arch a somewhat angular and distinctive appearance in the cuspid region. (*Fig. 6*) Thus, if we would allow this ridge to be the parting line and every student of dental anatomy learn to describe this surface as a smaller labial half and larger buccal half, there would be less difficulties in the making and supplying of these important teeth of the arches.



The medial and distal surfaces have no unusual characteristics. They should be reproduced in a manner that would enable the septal tissue to function and thus protect the peridental membrane. The contour should be formed in a manner that will place the contact point in right relationship with the neighbors, medially and distally, ever keeping in mind the fact that the distal surface is more convex in every direction than the medial surface and that the distal contact point is more lingually than the medial contact point. (*Fig. 7*)

The lingual surface of this cuspid is its most interesting part, both from the anatomical and physiological viewpoint. Anatomically this surface may be divided into unequal halves by a very strong ridge. This ridge begins at the point of the cusp and extends gingivally to the cervix ridge or terminates in a small tubercle or cusp. Such a cusp and two fossæ are present in about sixty per cent of the maxillary cuspids. This characteristic makes this surface similar to the occlusal anatomy of the mandibular first bicuspid, and it is not unlike to this tooth surface in function. The lingual ridge of the maxillary cuspids is convex-cavo-convex with a distinct fossæ medially and distally at the junction of the middle and gingival thirds. Each fossa is enclosed by its respective medial and distal marginal ridge. These two ridges in turn unite with the central ridge to form the lingual cusp or tubercle. The coalition of these ridges and the lingual surface is so complete that this surface is rarely subject to decay in either of the two fossa or pits. The distal marginal ridge is frequently crossed by a supplemental fissure or groove.

The general spear shape formation of this tooth would help us to think of it as an organ of prehension similar to those of the carnivora, but on closer observation we would be compelled to lay such an opinion aside as being unworthy of serious consideration. The writer questioned a number of his colleagues regarding the function of this tooth and its mandibular mate, but he received no real physiological answer. Hence he will have to venture his own opinion and you may take it for whatever you think it is worth. In its position in the arch it is at the dividing point in the arch. The teeth anterior to it are mostly concerned with the cutting or incising function while those distally are in a general sense the grinding teeth. Thus we find that we cannot class the cuspid with either of these in function. First, these teeth function very similar to the divider of the mower or binder, in that they limit the amount of food that may be engaged for the cutting function of the incisors. This enables the incisors to control the size of the bolus of food which in turn insures proper mastication and insalivation and good digestion. Secondly, this tooth in form and position prevents the food from being carried directly between the occlusal surfaces of the bicuspid and thus hinder the incising function of the centrals and laterals as well as the function of the bicuspid. When food is being engaged without the use of a knife and fork man will never take in any more than the cuspid positions will allow. Lastly, the peculiar lingual surface would function similar to the lingual surface of the maxillary central and lateral if the lingual ridge were not present. No doubt the smaller medial half does function with these two teeth, while the ridge, tubercle and the distal half functions similar to the mandibular first bicuspid. If the distal lingual half is not carved and contoured in harmony with its functional requirements, either in crown, Carmichael or inlay, or even the foil and cement fillings, food will sooner or later enter the inter-proximal space between the cuspid and the first bicuspid, notwithstanding a strong contact between these

two teeth. The distal ridge with its supplemental fissure must be there to direct the food through the lingual embrasure.

The statement that the contact between the lingual surface of the maxillary cuspid and the labial surface of the mandibular cuspid is the guiding and controlling factor in the movements of the mandible is without a physiological foundation. It no doubt has its origin in the tactile sense occasioned by the fact that they are the right and left keystones of the arch. However, if they were the controlling factors what would control the mandibular movements of a patient suffering from the malocclusion of class One or subdivisions according to Dr. Angle? Or what would a patient do who suffered with malocclusion and then had the laterals removed by some careless practitioner, thus allowing the cuspids to move forward into the lateral space? "The proof of the pudding is in the eating thereof." Clinical observation would not sustain such an opinion. The few cases that seem to give ground for it only prove the exception. Nearly ninety or more per cent. of all cases regardless of the general arrangement of the arches will show the points of two or more of the cuspids badly worn or almost obliterated by wear. Or the cuspid may be thrown out of alignment or articulation without regard to tactile sense by the force exerted by the ever-moving movable mandible.

MANDIBULAR CUSPIDS

The general anatomy of the mandibular cuspid does not differ a great deal from that of the maxillary, with the exception of the lingual surface and a few minor details of the other surfaces. The labial surface is more convex at the gingival third, while the middle and incisal thirds slope more rapidly toward the lingual, thus placing the point of the cusp and the two inclined planes or cutting edge lingually to the center of the long axis of the tooth. The cutting edge of the maxillary cuspid is labially to the long axis of the tooth. (*Fig. 8*)

The lingual surface of this cuspid is rarely other than a smooth convex surface. The general contour is convex from medial to distal with a strong ridge extending through its center from the incisal to the gingival third. The course of this ridge is convex-cavo-convex from the incisal edge to the gingival border. This surface does not have any strong marginal ridges; this no doubt is due to the fact that the mandibular cuspid does not function the same as its antagonist of the maxillary arch. The medial and distal surfaces are very much like the same surfaces of the maxillary cuspids. The general function of this tooth is that of sectioning and holding the food as well as guiding it to the tongue to enable this member to place the food in position in the bicuspid and molar regions.

The specialized function similar to that of the maxillary cuspid is intrusted to the mandibular first bicuspid. This no doubt accounts for the lack of specialized functional development of the mandibular cuspid.

THE MANAGEMENT OF TEETH DURING PREGNANCY*

BY WALTER N. ROWLEY, M. D., ROCHESTER, MINN.

MENTION OF TOOTHACHE and dental caries during pregnancy is found in all textbooks and in most articles on prenatal care. The statements that these patients should be "referred to a competent dentist," and "proper dental care instituted," is often seen, but there is little further in the way of comment or instruction.

Ballantyne, in a study of 100 cases in the Edinburgh Royal Maternity Hospital Antenatal Clinic, noted that 98 per cent. of pregnant patients had dental caries or infection, and 93 per cent. had submitted to one or more extractions. Fifty-three percent of the patients were less than twenty-five years of age and only two of these had undecayed teeth. The histories of these patients showed that the most common dental procedure was wholesale extraction and the use of plates; 48 per cent. of the 100 patients wore one or more plates. In a few instances a history of dental manipulation during pregnancy was elicited, but generally there was a prejudice against such interference during the expectant period and carious teeth were left strictly alone. Ballantyne believes that carious and infected teeth cannot fail to react on the mother's condition and retard the return to complete health in the puerperium. He argues that if surgical operations within the abdomen can be safely carried out during pregnancy, dental work can be done at this time. Goodman advises the early care of dental conditions in these patients and mentions the fact that dentists still fear the danger of abortion resulting from dental manipulation. He quotes Waller's experience which led him to believe that if the removal of dental foci is adequately carried out, even after it has produced symptoms, improvement in the mother's health is sufficiently rapid and substantial to be of signal benefit to the child. Roentgen-ray examination is a necessary preliminary to the removal of the infected teeth.

La Vake mentions infected teeth and tonsils as a possible cause of nephritis in pregnancy, of preclampsic toxemia, and of eclampsia; he reviews thirteen cases in which infection was a prominent feature. All his patients either had preclampsic toxemia or eclampsia, and all gave histories of endocarditis, rheumatism, toothache, and oral or tonsillar infection. Fever was present in all cases before convulsions occurred or before manipulation. Six of the patients were multiparas whose labors previously had been normal and who had a history of infection since the first pregnancy.

La Vake believes that every pregnant patient should be given a thorough dental examination with immediate eradication of foci of infection. He has never observed a case of abortion which could be attributed to dental manipulation. De Lee states that during pregnancy the teeth decay more easily than otherwise, due to alteration of the secretions of the mouth,

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perhaps because of the demand of the fetus for more calcium salts, or because the teeth partake of the general changes exhibited by the osseous system. He also considers it possible that certain obscure puerperal infections have their origin in abscessed teeth. The authors of most texts on obstetrics mention the superstition of the laity and the mistaken idea current among members of the dental profession with regard to the dangers that might result from dental extraction; no particular information is given further than that extractions may be done under gas and that extensive fillings should not be attempted.

Because the burden of conducting a woman through pregnancy to ultimate good health with the added comfort of a healthy child falls on the obstetrician, more and more co-operation is necessary in order that the best advice and care may be given to the mother. Focal infection with its possible effect has been a subject discussed with lively interest by the medical and dental professions for the past few years, and the teeth have become recognized as a vital factor.

Full mouth roentgenograms are made in the Mayo Clinic of every pregnant patient presenting any signs of dental or oral disease. Furthermore, a careful interpretation of these findings is made with the basic condition primarily in mind, and treatment is advised with a view to preserving the maximum usefulness of the remaining teeth, should extraction be carried out. Whenever a diagnosis of periapical infection is made, extraction is usually advised. If caries is advanced to such a degree that devitalization is necessary for proper restorative dentistry, extraction is preferred, since tiring dental manipulation is believed to be detrimental to the health of the patient and experience has shown that many devitalized teeth develop periapical infection. During pregnancy temporary cement fillings for cavities in vital teeth are preferred to more permanent inlays, and so forth. Cultures from roots of devitalized teeth extracted in the dental section of the Mayo Clinic have consistently shown a positive growth of streptococci usually of the viridans type. Pyorrhea should be treated by conservative measures and prophylaxis instituted when indicated.

In determining which of several periapically infected teeth should be extracted, the general condition of the patient is considered, signs of trouble attributable to focal infection are sought, and other sources eliminated as far as possible. Extraction may be advised in the presence of periapical infection, even though symptoms attributable to foci of infection are wanting. Teeth with frank involvement of the surrounding bony structure are selected first. Examination of the urine is always made at each antenatal visit, and if the patient is sent for the extraction of one or more selected teeth, later urinalyses are made. The local, as well as the general, reaction is carefully noted and taken into consideration before further extractions. Practically no general reaction is noted, even in cases of marked osseous involvement. In cases in which a slight general reaction is anticipated, temperature readings are made, but a rise is not often noted. When

a slight general reaction is manifested following the first extraction, more time is allowed between operations. The patients rarely show reaction after the second extraction, possibly as a result of immunization following the first extraction. Leukocyte counts are made in some instances; a group of cases is now being studied in which differential blood counts are made before and after extraction. A slight rise in the leukocyte count has been noted in a few cases. Most of the extractions are done by surgical technic, as described by Novitsky, Shearer, and Gardner. The granuloma is removed intact; the amount of trauma is minimized; and absorption is reduced. This accounts at least in part for the absence of general reaction.

A small group of thirty patients, reviewed preliminary to further work on dental management, shows a diversified type of case, represents nearly all periods of pregnancy, and includes instances of single extractions as well as extensive removal of infection from the mouth. In not a few cases there were complications to pregnancy, and removal of dental foci was only part of the general treatment. Twenty-two of the patients were more than twenty-five years of age, fifteen were in their first pregnancy, eight in their second, three in their third, two in their fourth, and two in their fifth. One of these had had nine gestations and only one full-term child.

The number of teeth extracted varies from eight cases, with one extraction each, to one case with fifteen extractions.

The period of gestation during which the extraction was done varied with the time the patient first presented herself for examination and with her condition. Eleven had extractions in the first trimester; this includes patients suffering with nausea and vomiting. Many patients did not present themselves for examination until the seventh month of pregnancy, and at this time seven patients had extractions. Six patients were examined soon after they felt quickening. Eight patients had extractions between the fourth and the fifth month, two in the sixth month, and two in the ninth month. Twenty were delivered at term; four are still pregnant and under observation; two aborted; four went into labor prematurely, one spontaneously, in the others labor being induced because of complications.

In the two cases of abortion the miscarriages were not dependent on the dental manipulation.

Case No. 1 (A233969). Mrs. F., primipara, aged twenty-four years, came for examination because of nausea and vomiting at the seventh week. The uterus was anteflexed. One tooth was extracted by her husband, a dentist. In seven days nausea and vomiting subsided so she was comfortable throughout the day. Six weeks later, about twelve hours after driving several hours over frozen roads, pain and bleeding commenced; abortion occurred two days later.

Case No. 2 (A360904). Mrs. S., primipara, aged eighteen years, suffered from marked nausea and vomiting. The uterus was acutely anteflexed. Three abscessed teeth were removed in the second month of pregnancy. Seven days later the patient left the hospital relieved of the nausea and vomiting. At four and one-half months, abortion occurred at home.

Her home physician attended her, and no cause was given; but it is likely the antelexion and farm work which she did were the most probable causes.

Labor was induced prematurely in four cases; in three of these because of marked albuminuria with evidence of renal damage in the eighth month. The babies and mothers survived without incident. In one case labor was induced at the sixth month for severe neuroretinitis. Another patient had a normal full-term pregnancy, and then had seven abortions in the third or fourth months. During the ninth pregnancy her general condition improved very much after tonsillectomy and the extraction of seven teeth. The blood pressure dropped from 170 systolic to 130 systolic, and from 126 diastolic to 90 diastolic. Pregnancy carried to seven months or a little over. An acute "cold" of moderate severity was followed by a sudden rise of blood pressure from 130 systolic to 180 systolic. Foetal movements stopped. Labor was induced, and the patient delivered a still-born child with multiple recent hemorrhages of the skin, liver, brain and lungs. The fourth patient left the Clinic and was not heard from until two months later when labor started prematurely at the seventh month, nearly three months after her extractions had been done. Other complications seemingly benefited by extraction were nausea and vomiting, local pain, and debility.

The most interesting case from the standpoint of benefit from extraction of abscessed teeth is that of a woman who presented herself for examination at the seventh month of pregnancy because of dyspnea, exhaustion, and rheumatic pains in nearly every joint. General examination led to the diagnosis of mitral endocarditis with insufficiency, aortic endocarditis with insufficiency, chronic rheumatic arthritis, and marked oral and dental sepsis. The upper left gum was markedly swollen; purulent material could be expressed from many points; and most of the teeth were carious and destroyed to the gum margin. The blood pressure was 140 systolic and 75 diastolic; the pulse rate was 120 per minute. The urine showed a trace of albumin. The temperature was normal, and a blood culture was negative after forty-eight hours on a blood agar slant. The left side of the upper jaw was cleaned up at the first operation and no change of the urine, temperature, and blood culture followed. The remaining teeth and roots were later removed, sixteen in all. Improvement was marked in ten days, and she returned for delivery one month later, when examination revealed the blood pressure to be 122 systolic, 76 diastolic, and pulse rate 84 per minute. There was no dyspnea, except on exertion; the pulse was more regular, the heart was reduced in size, and compensation was restored. Two months postpartum the tonsils were removed and dental work completed for full plates.

The study of this group of cases has led me to believe that the removal of teeth with periapical infection and extensive caries can be safely done during pregnancy. Surgical removal in such cases is preferable in the presence of definite roentgenologic evidence of granuloma. Careful roentgen-ray examination, interpretation, and co-operation with the dentist are

highly essential. Surgical extractions in these cases should be done according to a definite plan, with a careful consideration of the number of teeth to be removed at one operation, the condition of the patient and her reaction following the first extraction. Repeated examination of the urine, temperature, and leukocytes should be made, and the general symptoms of reaction manifested by the patient should be carefully observed. Pyorrhea should not be overlooked and cavities in vital teeth should be filled with cement rather than with more permanent materials. In the presence of pathologic conditions associated with pregnancy, the same precautions must be taken as are observed in similar conditions existing independently of pregnancy. The eradication of foci of infection other than the teeth is equally important in the hygiene of pregnancy.

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WHEN MILLIONS OF MEN

Buck Up, Think Up,

Talk Up,

Business will **WAKE UP**

Rotary Club Members

THE PROPER TREATMENT OF ENAMEL

BY J. P. CARMICHAEL, D. D. S., MILWAUKEE, WIS.

(Written for THE DENTAL SUMMARY)

THE ENAMEL OF A TOOTH is well named, as it is a covering of the nature of glass. When we deal with enamel, we must not lose sight of that fact that after it has been scratched by any hard substance, we have a most difficult problem to deal with in removing these scratches and restoring its natural brilliancy.

It is quite impossible to cut the enamel of teeth, although it can be shattered. To drill a hole in enamel, we use a cross-cut bur which tears its way through. This bur would tear its way through a piece of glass in the same manner. The same substances that scratch enamel will scratch glass; for instance, try pumice stone on a pane of glass, and notice the effect—it scratches the surface just as it does the enamel.

No matter how finely pumice stone is powdered, it remains a sharp, cutting, crystalline abrasive that has no polishing qualities. If you want to wear a surface away, use powdered pumice stone. To apply pumice to a tooth that has a natural brilliancy is nothing less than criminal. The first stroke of the polishing wheel, charged with powdered pumice, will instantly destroy the natural brilliancy and luster, and if the tooth is made dry, this condition is plainly seen. Not only has the luster been destroyed, but the porosity of the tooth texture has been opened, and the enamel made susceptible to stains and the adhesion of foreign matter. Untold harm is often done by using a dentifrice containing powdered pumice stone.

Tooth texture possesses a quality of viscosity making it capable of being drawn, an effect similar to the burnishing of metal. This is often noticeable on the occluding surfaces of the teeth where the enamel is worn away. The dentine will be found to be, oftentimes, as hard as the enamel itself, a result of the friction in mastication at the occluding surfaces whereby nature demonstrates that to polish and harden the enamel properly, friction is required. To polish the enamel of teeth, the important thing to remember is that the powder must be one that does not scratch the surface.

If we consider the condition found on the surface of a tooth that has been ground with a carborundum stone, or cut with a bur, it will show a broken, crackled surface. Finish this surface smooth with a dry sandpaper disk, followed by a dry friction powder, and the tooth will become glazed and hardened to such a degree that it will ward off all external influences. This treatment also provides a way of correcting the sensitive surfaces on teeth. In cavity preparation, the walls and cavity margins can be so smoothed and hardened as to entirely correct discolorations which are so commonly seen about fillings and inlays, called "leaky fillings."

To polish any substance, it is first necessary to work out the coarse scratches with a finer abrasive until the surface is perfectly smooth. A friction polish which possesses a definite quality of resistance for burnish-

ing the surface is required. Obviously such a substance will be effective only when applied dry. It will restore the natural, sparkling brilliancy to enamel, even after it has been dulled or scratched by pumice or other harmful agents.

FOLLICULAR OR DENTIGEROUS CYST

BY RAYMOND J. WENKER, B.S., D.D.S., M.D., MILWAUKEE, WIS.

THIS TYPE OF CYST BELONGS to the group of neoplasms known as odontomas. They are the result of a perverted growth of some of the cells in a tooth follicle. The histologic characteristics of the tumor will depend on the particular cells of the follicle which became abnormal in growth. Odontomas have been variously classified by different authors. Scudder¹ gives the following classification, which is a modification of Bland-Sutton's list: *First*, the dental root cyst; *second*, the follicular or dentigerous cyst; *third*, the compound or composite follicular cyst; *fourth*, the adamantine epithelioma, and *fifth*, the hard odontoma. A brief review of the embryology of a tooth follicle may result in a better understanding of the pathogenesis of these tumors.

In the development of a tooth, the deeper or malpighian layer of the oral epithelium grows into the mesodermic zone of the rudimentary jaw. The extended portion of this deep layer is called the epithelial cord. As the latter grows deeper into the jaw, it becomes the primitive organ which forms the enamel.

The papilla, formed by the surrounding connective tissue, develops simultaneously with the enamel cap. The latter completely envelops the papilla like a double-walled hood. The dentin, cementum and tooth pulp are developed from the papilla. The enamel organ and papilla are completely encircled by a tooth sac. These three form the tooth follicle.

The point of special interest in this connection is that some of the epithelial cells in the enamel organ cease to function. It is from these arrested cells that one source of the peridental epithelial debris of Malassez may originate.

Malassez thought that these epithelial cell rests may originate from: *First*, the source just mentioned; *second*, some other portion of the epithelial cord; *third*, the mucous membrane of the fetal jaw. Malassez was the first investigator to call attention to these epithelial rests and to suggest the manner in which cysts and other pathologic growths of the jaw may originate from them.

The Arthur Hopewell-Smith² theory is that "an excessive secretion of

*Read June, 1921, in the Section on Stomatology (A. M. A.) of which, by special arrangement, THE DENTAL SUMMARY is the representative organ for the dental profession.

¹Scudder: Tumors of the Jaws, 1912.

²Hopewell-Smith, Arthur: Histology and Pathohistology of the Teeth and Associated Parts, Philadelphia, P. Blakiston's Son & Co., 1903.

fluid takes place between the enamel, or Nasmyth's membrane, and the follicle, which, accumulating, distends the space and produces a cyst."

Other theories of the pathogenesis of these cysts are the Magitot periostic-inflammation theory, the Sarren foreign-body-encystic theory and the Albarran and Dequidt theories. The two latter are but modifications of the Malassez, Magitot or Sarren theories.

Referring again to the classification of odontomas, it will be seen that there are virtually but two types of jaw cysts in this list; *First*, the root or periosteal and; *second*, the follicular or dentigerous cyst. The other kinds of cysts in this classification are modifications and complications of these two primary types.

The periosteal or root cyst usually follows disease or injury of the tooth or teeth involved. The dentigerous cyst is apparently not primarily associated with disease or injury. In the latter the tooth follicle becomes filled with fluid, expands and the tooth fails to erupt. The filling of the follicle progresses slowly, causing both absorption and expansion with new growth of the surrounding tissues. The spongiosa and contiguous tooth-roots yield by absorption and displacement, while the cortex is modified mainly by expansion and new growth as the cyst increases in size. Thus, the cortex is usually sufficiently thick in a mandibular cyst to prevent pathologic fracture, although the expansion may be very considerable.

In the majority of cysts reported, the patients have been operated upon between the ages of 20 and 30. Cases have been reported, however, connected with deciduous teeth, as early as 9, and others connected with third molar teeth, as late in life as 65.

Primarily, the cystic fluid is probably sterile, but it may become infected by injury or surrounding disease. Destruction of the pulp of a contiguous tooth as result of radicular absorption from pressure of the growing cyst, or from caries, injury or other causes, may be the source of surrounding infection to invade and complicate the cyst.

In the primary uncomplicated condition, the cyst is usually of slow growth, noninflammatory and not painful. The mucosa and integument remain intact and retain normal color. The cyst may, however, become inflamed, painful or malignant. The latter is an exceptional complication to develop, and may take the form of an adamantine epithelioma, a carcinoma or a sarcoma; most commonly the first mentioned, and the next in frequency the carcinoma.

The position of the teeth in the cyst is variable. When one tooth is involved, it is commonly well developed and perpendicular, or nearly so, with the crown presenting more or less in the direction of the contiguous teeth. Impacted teeth, especially upper cuspids and lower third molars, may, however, lie in any position in which they may be found under other conditions. When several teeth are involved in the growth they are more frequently irregular in position and in development. In some cases, only irregularly formed pieces of tooth material appear. Moreover, some cases have been reported in which no evidence of a tooth-like object could be

found. Scudder contends that a true follicular cyst may not necessarily contain a tooth, especially if the growth of the cyst begins very early in relation to the development of the tooth involved.

PERIOD OF GROWTH AND SIZE

It would appear that the growth may continue indefinitely were it not terminated by operative interference or death of the host. Some cysts have been reported the size of a filbert, while others were the size of a grapefruit. The rapidity and the length of the period of growth, before operative interference, appear to determine its size.

PATHOLOGY

The cyst may be single or multiple; most frequently it is single. The sac is composed of a thick wall of connective tissue, irregular in outline, which may or may not be calcified. In examining the lining of these cysts, it is natural to expect to find it composed of epithelial cells because of their protective function. However, in practical experience some cysts are found to be lined with connective tissue cells. This may be partly accounted for in the destruction or loss of the delicate epithelial lining in making and staining the microscopic specimens. Uninfected cysts may contain a more or less clear or gelatinous fluid with or without evidence of a fatty degenerative process. In infected cysts the fluid is a turbid sanguinolent or purulent material, with numerous bacteria and inflammatory products.

DIAGNOSIS

A good history, followed by thorough clinical and X-ray examination, will usually clear up the diagnosis. A more or less slow growing and hard tumor with little or no pain, associated with an unerupted tooth, and especially when located in the mandible, is suggestive of a follicular cyst. Rarely, evidence of a tooth or teeth may not be discovered in the roentgen-ray examination. A toothless cyst should be differentiated from a root-cyst. The history, or a careful test for pulp vitality, may clear this question. However, the history of prior extraction of particular teeth, and especially of the previous pathology of these teeth, is very unreliable. It is quite probable, therefore, that some of the so-called toothless cysts which have been reported were in reality root-cysts from which the offending teeth were previously extracted. A dentigerous cyst in the antrum may be difficult to differentiate from a root-cyst or from a chronic antrum infection. However, surgical experience indicates that a cyst in the antrum is most frequently a root-cyst. Moreover, operative procedure would be quite similar in either case, and prior diagnosis, although desirable, would not be a necessity. In case of a painful and inflammatory cyst, a critical examination of the surroundings for diseased teeth, as well as an analysis of the history of recent accident, should be made to determine the cause. Rapid growth, pain and inflammation which cannot be explained by injury or localized infection is strongly suggestive of malignancy. An exploratory operation is indicated in all cases of suspected malignancy for macroscopic and microscopic examination and final diagnosis. In case no malignancy

or localized cause is found to explain the existence of the pain, a search for a remote cause should be made to aid in clearing the diagnosis prior to removal of the cyst.

TREATMENT

Preoperative.—The usual physical examination to determine the operative risk is a wise expedient. Removal of all diseased teeth, a general improvement in mouth hygiene, and in some cases the removal of the tonsils, are indicated.

Operative.—In the majority of cases the Partsch method of enucleation, with slight modifications, is the operation of choice. I have adopted the plan, whenever practical, of approaching the cyst through an opening made within the mouth. A window is cut through the soft and hard tissues at a point and of a sufficient size to give the necessary access to all recesses of the cystic cavity. The sac is carefully shelled out or separated from all of the surrounding structures and removed. After the hemorrhage has been arrested, the housing place of the cyst is carefully dried and examined. A small electric lamp is inserted into the cavity to facilitate in making this examination. The relative thickness of the remaining bridge of bone may thus be observed, and the probability of pathologic fracture estimated. The interior is also examined to locate important nerves and blood vessels, that they may be safeguarded against unnecessary injury. Moreover, examination is made to locate loose fragments of bone, pieces of cystic membrane and projecting roots of contiguous teeth, all of which are removed. The cavity is again thoroughly dried and cauterized, 95 percent phenol (carbolic acid) or 50 percent silver nitrate being used. After applying the antidote for the caustic used and again drying, the cavity is packed with gauze saturated with petrolatum, or equal parts of guaiacol, balsam of Peru and petrolatum.

The deformity, resulting from the expansion of the bony cortex during the growth of the cyst, usually disappears spontaneously, in from a few months to a few years.

In large cysts where no bridge of healthy bone remains, when the cyst is large and multilocular with considerable new growth of osseous tissue, and in malignancy, resection may be justifiable.

Postoperative.—Some cysts will require repeated recauterization and repacking, while others will require very little attention, except to keep them clean. Roentgen-ray or radium is not a necessary postoperative treatment, except in malignancy.

REPORT OF CASES

Case No. 1. Mrs. R. K., aged 27, whose family and personal history were negative, complained, May 11, 1917, of a large swelling in the region of the lower left cuspid. The growth was first observed six years previously. I found that the lower left cuspid and first bicuspid were missing. This space was spanned with a bridge, the abutments of which were loose. The patient stated that the first bicuspid had been extracted, but that the

permanent cuspid had not. The tumor was about the size of an English walnut. It was very hard and had never caused any pain. It extended well into the floor of the mouth, interfering with speech and buccally enough to attract attention at a considerable distance.

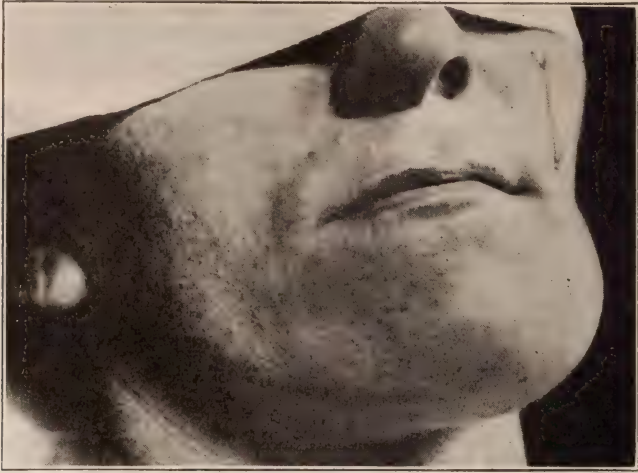


Fig. 1 (Case 1).—External appearance of unilocular dentigerous cyst before operation.



Fig. 2 (Case 1).—Outline of cyst with permanent cuspid in lower part of cavity standing in perpendicular position. Note the buccolingual diameter. The entire bony wall surrounding the cyst was a thin layer of cortical bone.

I made a clinical examination and tentative diagnosis of a follicular cyst. Roentgen-ray examination confirmed this diagnosis and demonstrated a fully developed cuspid in the lower anterior portion of the cyst.

I operated and removed it, June 26, under ether anesthesia. A large window was cut through the bucco-occlusal aspect of the cystic wall, and the sac punctured to facilitate its removal. The fluid was clear, amber colored and did not yield a culture. The cystic sac was about one-eighth



Fig. 3 (Case 1).—Cyst with lower cuspid pulled out of the sac but adhering to its wall. Cystic membrane is attached near the apex of the cuspid. The teeth on either side of the cyst show marked apical absorption.



Fig. 4 (Case 1).—Appearance of bone, two and one-half years after removal of cyst. Observe the amount of new growth and solidity of bone filling former cystic cavity. The deformity had disappeared almost completely, and this was effected spontaneously.

inch (3 mm.) thick in the lower portion around the cuspid apex where it was attached to the tooth. The upper part of the wall was much thinner, but tough. Following the removal of the cyst, an examination was made which elicited the apices of the lateral incisor and second bicuspid pro-

jecting into the cavity. These were partly absorbed and therefore were extracted. The cystic housing was generally rounding, but with numerous small superficial surface depressions and irregularities. Nothing but the cortical layer of the bone appeared to span the space.



Fig. 5 (Case 2).—Appearance of multilocular dentigerous cyst before operation. Two bicuspid in cystic cavity; lobular extension of growth to a point posterior to the second molar.

The specimens were three teeth and a cystic membrane. The cyst was demonstrated to be attached to the root of the cuspid near the apex and enveloping the remainder of the tooth. The cyst was of the unilocular type.

Microscopic examination revealed an epithelial lining.

The slight reaction in temperature following the operation was remarkable, although the lingual glands and the face were swollen considerably. The highest temperature reached was 98.8.

In two and one-half years the deformity had completely disappeared, and the cavity was refilled with new osseous material.

Case No. 2. Mr. E. S., aged 22, whose family and personal history were negative, complained of a painful swelling in the right mandible in the region of the bicuspid. These premolars were unerupted. The first molar had no cavity, but was loose and tender on percussion. The periosteum was elevated and the soft tissues were slightly swollen on the buccal aspect, while the lingual side was normal.

A clinical diagnosis of an infected dentigerous cyst was made. Radiographic examination confirmed this diagnosis and brought to light the fur-

ther fact that it was of the multilocular type. The cyst extended from the cuspid to the second molar and had expanded slightly in a buccal direction.

I operated and removed it under ether anesthesia, September 13, 1919. On the morning of the operation the gum and periosteum on the buccal

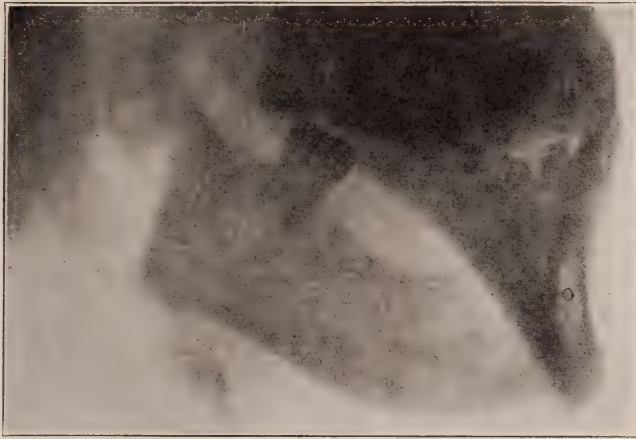


Fig. 6 (Case 2).—Appearance two and one-half months after operation. The deformity in this case was slight and had completely disappeared spontaneously in three months.

surface as well as the cheek were moderately swollen and reddened. A large window was cut through the soft and hard tissues on the buccal side of the cyst extending from the cuspid to the second molar and apicogingivally it was made sufficiently large to give a complete exposure of the unerupted teeth and diseased material. The abscessed first molar was extracted. The two bicuspid, which were of normal size and shape, were dislodged and, together with the cystic membrane and a large amount of necrotic material in the molar region, were removed.

The tissue specimens were the first molar, the roots of which were absorbed, a large amount of soft necrotic bone, and a multilocular cystic membrane. Microscopic examination of the membrane demonstrated a lining of connective tissue cells. No evidence of malignancy was found.

The reaction from this operation was quite pronounced, but of short duration. Very little postoperative treatment was necessary, and very little fluid oozed into the cystic cavity to cause annoyance. Recovery with complete healing of cavity took place in two months.

ETIOLOGY, PATHOLOGY AND TREATMENT OF
CYSTS OF THE JAWS

GEORGE M. DORRANCE, M. D., PHILADELPHIA, PA.

The particular reasons for this paper are, first, that cysts of the jaws are not widely known among general surgeons, and, second, that there are certain interesting etiologic factors which I desire to mention.

There are many classifications of cysts and many names given to them; but the simple classification into radicular cysts, follicular cysts and multiocular cysts, which fulfills the pathologic anatomic requirements, is the one I shall use.

It is difficult to estimate the frequency of these cysts. From the medical literature, one would think they are comparatively rare. This is not true, however. They are rather common, if one is on the lookout for them, particularly if one has the teeth roentgenographed, as this is the usual method of detecting them. After a rather careful survey of the literature and from my own records, I find that they occur in about the proportion of: radicular, 80 per cent.; follicular, 20 per cent., and multilocular, 1 in 2 to 3,000.

ETIOLOGY

Radicular cysts occur most commonly between the ages of 20 and 30. They are occasionally seen in milk or first teeth; but this occurrence is so exceptional that I shall disregard it. It is essential for the development of a radicular cyst that one has death of the pulp with subsequent development of a granuloma, this granuloma developing into the cyst. There have been a great many theories and academic discussions as to the origin of the cyst, but the consensus of opinion is that the cyst develops from the epithelial sheath of Hertwig (debris epitheliaux de Masassez). It is essential to understand that this is always a chronic process. The pathologic sequence for the development of the condition is: *First* death of the pulp; *Second* development of a granuloma, and *Third* bacterial or toxine. Irritation of these so-called epithelial rest cells in this sheath of Hertwig stimulates them to an overgrowth, which goes on until lining becomes epitheliated.

These rest cells take on a bell shaped formation, and from them a mucoid degeneration occurs and produces the gelatinous fluid found in these cysts. This process is very gradual. If this process, after the death of the pulp takes place, is very rapid and the tissues do not overcome the infection, we have developed an acute abscess which I want to insist is an entirely separate and distinct condition. The position of the development of these cysts is interesting and led me to study these conditions to see if their location had any particular significance

*Read, 1921, before the Sec. of Stomatology (A. M. A.) of which, by special arrangement, THE DENTAL SUMMARY is the representative organ for the dental profession.

as to their etiology. These cysts develop more commonly in the maxilla than in the mandible. It is the upper lateral incisors that are most commonly affected, next the canines, third, the lower central incisors and finally the upper molars. The point I wish to draw, and which is entirely new as far as I can find in the literature, is that the lateral incisor and the canine are situated where the intermaxillary process fuses with the maxillary process. I do not know whether this had anything to do with the cysts being more frequent in this position; also, in the mandible they occur most frequently where the two processes join, that is, the central incisors. I was unable to prove this point. It does not seem to fit in with the cysts which develop in the other teeth. However, it may have some bearing on the frequency of the location of the cyst. If, for any reason in the occlusion of the teeth, one tooth strikes its opponent before the remainder, it seems to be a factor tending to produce a cyst. Regulating the teeth (orthodontia) is not sufficiently practiced for one to be sure whether or not this has any bearing on the subject. I have not been able to assure myself that this has any significance.

The development of this radicular cyst, then, is death of the pulp, and gradual development of a granuloma due to irritation, with development of a cyst which, in turn, causes absorption and distortion of the surrounding bone structure.

Follicular cysts develop from the enamel sac which surrounds an unerupted, supernumerary or abnormal tooth which takes on a hypertrophy and proliferation at the time at which the tooth should be erupted. For instance, the canine cyst starts developing in the ninth year, the cyst of the third molar at approximately the eighteenth or twentieth year. It is more common in the maxillary canine, because this is the one most frequently displaced. It displaces the bones in which it is situated the same as any other cysts.

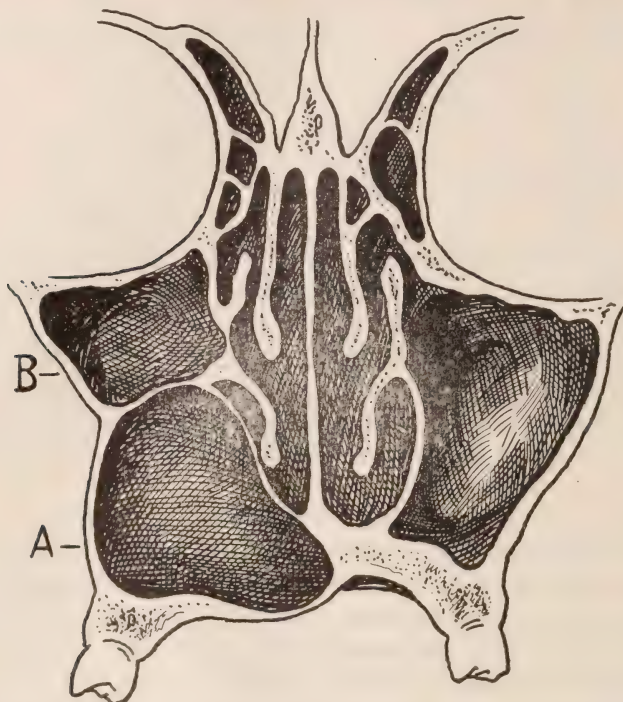
Multilocular cysts are seldom seen except in the ramus of the mandible. A multiplicity of names have been given to them from the name of epithelial odontomas (Sutton) to the term proliferating follicular cystomatous. They are developed from the posterior extremity of the enamel ridge. The pathology is very much confused. My opinion is that these are nonmalignant cysts having many cavities, some communicating and some not. To explain the malignancy that occasionally occurs in these cysts, I think it is only the usual amount of malignancy that occurs in any abnormal slow growing tissue that develops from misplaced epithelium. They develop between the ages of 20 and 30 years, as 20 is the time that the portion of the enamel ridge immediately preceding this portion forms the lower third molar.

DIFFERENTIAL DIAGNOSIS

Cysts in general must be diagnosed from very few other conditions. In their early stage they are practically all at first recognized by the roentgen-ray. First, it must be differentiated from suppuration of the antrum and a condition called hydrops of the antrum or a cystic degenera-

tion of the antrum, which I have never seen, and from various tumors, such as osteoma and sarcoma. On account of the early age at which cysts are noted, carcinoma is usually not present.

The difference from disease of the antrum is first a difference in the history, a discoloration or absence of a tooth point to a cyst. The roen-



A, cyst cavity; B, displaced antrum. Note depression of palate and elevation and lateral compression of lateral wall and floor of nose.

gen ray materially assists in the diagnosis. Second, the cyst is usually more anterior on the alveolar margin than a distended antrum would be. Third, the almost pathognomonic sign of cyst disease is the crackling feel of a ping pong ball—former writers called it parchment-like.

Transillumination has been of very little value. A needle puncture, under local anesthesia, will almost always clear up the diagnosis. The symptoms of a cyst are: If small, they are usually first discovered accidentally by a roentgenogram. The patient first notices a slight swelling which grows very gradually without pain in all but the multilocular variety. It is observed most commonly above the lateral incisor and canine in the alveolar margin, but again may first show itself by a swelling or enlargement in the hard palate. The physical signs early consist in a bony enlargement, later followed by the ping pong crackling on palpation, with the elevation of the floor of the nose of the side affected, if the cyst is in that area.

DIFFERENTIAL DIAGNOSIS OF THE DIFFERENT CYSTS

Radicular	Follicular	Multilocular
Ages: 20 to 30	Ages: 12 to 20	Ages: 25 to 35
Condition of teeth: Usually a dead tooth	Absent tooth	Normal
Most common: Upper jaw at apex of lateral incisor	Upper jaw at apex of lateral incisor	Mandible
Roentgen ray: Rarefaction at apex of tooth	Unerrupted tooth	
No pain	No pain	Pain
No elevation of temperature	No elevation of temperature	No elevation of temperature

TREATMENT OF RADICULAR CYSTS

If the cysts are small and are seen early, a small incision is made through the alveolar mucous membrane, and the outer table of bone is trephined or chiseled away. The root of the tooth is amputated, and the cyst lining is separated from the surrounding bony margin by a twisting motion. The entire sac of the cyst is removed. A small amount of iodoform is dusted in. The cavity is allowed to fill in with a blood clot; the mucous membrane is sutured in place. It is taken for granted that the root has been filled. At times, it may be necessary to extract the tooth which is the cause of the cyst. At times, these cysts remain after a tooth has been extracted, but this is rare. If the cyst is larger than an agate, depending a good deal on the size and the distention that have been produced, other methods may be indicated, such as the method popularized by Partsch, which consists in removing the alveolar margin overlying the cyst and without attempting to remove the membrane, pack, etc., with iodoform gauze so as to make the cyst cavity an accessory cavity to the mouth. The essential part here is to make the opening large enough and, of course, either extract the tooth or have the root amputated and the canal filled. There are cases in which it is possible to make the cyst cavity an accessory cavity to the nose by removing the nasal wall of the cyst, which in reality is the outer wall of the inferior meatus, the same as one would do in a Caldwell-Luc operation. As suggested by Richter and Waldron, independent of each other, you would first do a Partsch operation and then, at the same sitting, remove the portion of bone between the cyst and the inferior meatus and have the packing come out through the nose. I have found it much more satisfactory to perform an operation patterned after the Denker operation, which consists in removing the anterior wall of the cyst and the portion of the wall between it and the nose—a Denker operation in reality.

The disadvantage of the nasal method is that one frequently sees large amounts of crustations collect in the cavity. I would especially warn against opening these cysts through the roof of the mouth, as it

necessitates wearing a plate, etc. It is interesting to note that after opening a cyst the portion of the palate bone which has been involved and thinned by the distention of the cyst returns to its normal contour, and bone is again deposited.

An almost complete bibliography of the foreign literature can be obtained from the reprint of Dr. Erich Becker.

ALVEOLAR PROCESS RESECTION*

BY CARL D. LUCAS, D.D.S., INDIANAPOLIS, IND.

RESECTION, AS APPLIED IN ORTHOPOEDICS, refers to the cutting away of a portion of tissue. Alveolar Process Resection therefore means the cutting away of a portion of the alveolar process of the upper maxillae, or the lower jaw, or both jaws, as indicated.

PURPOSE

The writer first performed this operation complete upon the upper and lower jaws for an individual in 1912, for the purpose of making it possible to place artificially substituted teeth upon the resultant ridges for the patient in question, in such alignment as to produce natural cosmetic results for the benefit of the patient, who presented with a decided orthognathism, magnified by a pathologic periclasia.

ANESTHETIC

This operation may be successfully and painlessly performed under conducive anesthesia, infiltrative anesthesia, or general anesthesia.

If a definite, localized, pathologic condition be present in an individual case, or the patient's history record contra-indicates general anesthesia, conducive anesthesia should be the choice. If no definite localized pathology be in evidence, and cosmetic requirements indicate alveolar process resection and general anesthesia be contra-indicated, infiltrative anesthesia may be employed for the anterior portion of the upper jaw.

On account of the nervous shock incident to the resection of the process by rongeur forceps or chisels or both, general anesthesia for neuresthenic patients is the procedure of choice, whenever the patient's history findings permit of a general anesthetic.

However, we deem it wise to operate either the upper or lower jaw at one operation, and complete the operative procedure at a later scheduled date, within ten days after the first operation, thereby reducing the liability to surgical shock from a prolonged general anesthetic.

A most strict chain of asepsis must be followed, thereby precluding a resultant osteitis or osteomyelitis. Surgical principals, therefore, must be rigidly adhered to if the success of the operation would be assured.

Surgical technic may be acquired only by a definite surgical training and

*Read before the Northern Ohio Dental Association, 1921.

a careful observance of general surgical principles. The average dentist is not, therefore, scientifically equipped to perform this operation, and we sincerely believe he should not be permitted to perform it, even though he may have the colossal conceit to attempt it.

If a dentist desires to fit himself to practice oral surgery he should proceed to prepare himself in a definite, scientific manner to practice this specialty. A two weeks' course in exodontia never has qualified any dentist to practice exodontia, and we are convinced that special training for the practice of oral surgery requires a much more extensive training in the principles and practice of surgery and the technic of surgical procedures, a comprehensive understanding of anesthetics, pre-anesthetic preparation and post-operative care of patients, physical and microscopical diagnosis and a definite understanding of hospital methods of procedure, charts, diatetics, etc.

Within the past year or two many dentists have felt divinely called upon to practice the specialty of oral surgery and exodontia, with a very meager or no special preparation, and upon analysis of this situation we find that the "divine call" was the Almighty Dollar. Such empiricism is not only deplorable and a disgrace to our profession, but is a crime perpetrated upon the unsuspecting public.

Time will not permit a further reference to physical diagnosis, history, records, anesthetics, pre- and post-operative care of patients, *et cetera*, but qualified oral surgical specialists are necessarily prepared to observe these principles, and the empiricals should let their consciences be their guides and develop an inner conscience about the dollar mark by placing themselves in the position of the victims of their operative procedures.

OPERATION

After the field of operation has been prepared, following the aseptic technic described in a previous paper by the author, an incision is made parallel with the highest point of the cervical margin, labially and buccally, beginning at the bucco-cervical margin of the last remaining tooth upon the left side of the jaw, carrying the incision forward to the cuspid tooth of the opposite side of the same jaw.

The labio-bucco, muco-periosteum is then elevated with a periosteotome to a line approaching the apices of the teeth to be extracted, governed by the degree of resection indicated for the individual case. Three sutures may be placed, attaching the freed muco-periosteum to the labial mucosa about four millimeters above the contiguous surface of the lip, as retraction sutures. The teeth are then extracted with forceps, elevators or chisels. If forceps are used, the outer beak may be placed outside of the labial or buccal process, the upper jaw and the teeth extracted labially or buccally in cases which require extensive resection.

Bane's rongeur forceps number eleven (No.11) are used for resecting the outer plate of process, placing one of the beaks in the orifice of the socket and the other at a predetermined point upon the outer plate of process, governed by the amount of resection necessary in the individual case.

The forceps are then placed with one beak in a socket and the other in the next approximating socket, with the convex side of the crescent of the forceps placed lingually, and a proportionate amount of the intercepal process thus resected.

In some instances the labial plate of process is resected to the apices of the sockets, *e. g.*, in cases of orthognathism; while most frequently the resection is carried to a degree which will result in an ultimate alveolar ridge of rounded or slightly undercut proportions depending upon the case in hand and the mentally deducted degree of resection necessary as a future prosthetic requirement.

The infected periapical crypts are then curetted free of granulæ, their circumferentially sclerosed process, the pathologic sockets, sponged with phenol, followed by 70% alcohol.

The linguo-gingival margin is then pared, beginning at the last socket and running the incision forward to the cuspid tooth of the opposite side of the mouth, and the intercepal gingival tissue removed.

The labio-bucco muco-periosteum is then freed and sutured to the freshened lingual gingival tissue, using number four (No.4) black or white silk, linen or dermal suture material, starting the suture at the median labial fraenum, making continuous suture line, running posteriorly, tying at the distal extremity of the ridge.

The same technic is employed upon the opposite side of the jaw under operation, carrying the operation from the cuspid tooth posteriorly.

A triangular piece of gum tissue just distal to the last tooth socket is removed to facilitate a neat closure of the distal suture line. The sutures are left in for from four to ten days, depending upon the degree of healing in the individual case.

In a great many cases,—for example, those in which we find the upper anterior natural teeth with their incisal edges at a 10 or 15 degree angle anteriorly to their apices, therefore supported labially with a thin labio-alveolar plate,—we most strenuously advice against alveolar resection to the degree which will permit of suturing. In such cases only the protruding, official labial border and the spines of intercepal bone should be resected. In such instances the muco-periosteum should not be dissected apico-rootwise more than three or four millimeters.

Such a muco-periosteal dissection will not permit of a closed suture line; however, the intercepal gum tissues should be removed in such instances, to preclude the possibility of this tissue, if it be not removed, resulting in excessively large unattached papillæ, which seriously interfere with the wearing of the denture. In these cases the ideal preparation is the preservation of all the healthful plates of bone which do not form excessive undercuts of sharp spines of bone. Perpendicular or slightly undercut labial and buccal borders with smooth rounded ridges must be our ideal result, therefore a proportionately slight degree of resection is indicated in the posterior as well as the anterior portion of the mouth and stay sutures depended upon instead of a closed suture line.

In cases of large areas of osseous destruction at and extending beyond the apices, in localized areas, a crescent-shaped incision in the apical region may be resorted to, and access to such crypts gained through the apical portion of the outer plate, by cutting a window through the process and curettement made through such an opening. This technic permits of leaving the outer plate near the cervical margin, thereby permitting a blood clot to form in the socket and subsequently a regeneration of bone sufficient to produce a rounded, symmetrical ridge.

Impressions may be taken immediately following the completion of the operation, and dentures constructed therefrom, but we advise our patients to wait until after the removal of the sutures before having impressions made. About ten days following the operation has proven, by extensive experience, to be the better time for impression-making for dentures.

An antiseptic mouth wash is prescribed for the patient to be used every two hours for four days and three times per day thereafter until the sutures are removed.

Too much of the outer plate of process is resected in the majority of such operations performed. It is necessary to remove all of the grossly infected process in all cases, but we have observed many cases post-operatively in which the outer plate has been wantonly resected to the apices of all sockets and some operators unnecessarily remove the lingual plate to a degree.

The lingual plate should never be resected below or above the lingual orificial margin of the sockets, except in rare cases where this osseous tissue is grossly septic. If the labial plate be resected to the apices of the sockets we observe, after the case is ready for dentures, that we have a double incline plane labially, or buccally and lingually from one extremity of the ridge to the other.

The ridge in the shape of a double incline plane absolutely destroys the labio-buccal valve seat which is necessary for retention of dentures, combined with the palatal valve seat which should securely seal the upper denture labially, buccally and palatally. Within a few weeks the outer incline plane become very rigid or firm, thereby completely destroying the entire outer valve-seat for the rim of the denture, causing the denture to very easily become unseated upon the slightest pressure in the bicuspid and molar regions, or yawning, sneezing, coughing or even talking will often cause the upper denture to become dislodged.

Articulated study models of the patient's natural teeth should be at hand before the contemplated resection is begun and these models should be studied frequently during the operation. The relation of the teeth to the process, the bite, the thickness of process and the natural relation of the jaws should be constantly under consideration during operative proceedings.

Roentgenograms of all cases should be required and roentgenographic evidence of pathologic foci should be considered in the pre-determination of the extent of resection necessary in localized areas.

The same general rules apply to this operation in the lower jaw.

We should understand the laws of physics which are applicable to prosthetic denture replacements and govern our operations accordingly.

Hume-Mansur Bldg.

CAVITIES—THE PREVENTION OF PULP IRRITATION*

BY L. G. NOEL, M.D., D.D.S., NASHVILLE, TENNESSEE

IN SPEAKING OF THE TREATMENT of exposed pulps, I will say the experienced practitioner will be able to recognize the few cases that present where the capping of exposed pulps promises success. For the most part, these will be cases where the teeth have not ached violently; where the spooning out of dentin softened by acids may slightly expose a projecting horn of the pulp, maybe bleeding it slightly.

These cases may be managed successfully for persons in good health, provided the wounding of the pulp is slight and not inflicted by an infected bur. Burs should not be used to remove decalcified dentin in deep decays, and the spoons employed should be large enough not to penetrate the pulp, but to scrape over it. Burs and chisels are useful for cutting back the enamel to give access to cavities, but should not be employed for the removal of decalcified dentin. Dr. Black's rule for diagnosis, as set forth in his "Special Pathology," is that we are to regard any pulp exposed by caries as infected, and saving a few exceptions, such pulps should be removed and the roots filled. The exceptions will include the first permanent molars when exposed in young subjects before root growth is complete, and many other teeth in the mouths of healthy young persons who can be kept under observation. Teeth that have had exposed pulps requiring a cap when filling, should be radiographed from year to year, and subjected to other tests to determine their health and vitality; because it is a well-known fact that pulps may die under fillings, and the teeth may stand a number of years after death of their pulps without visible signs of abscess appearing; albeit in many such pulpless teeth a radiograph will show a blind abscess, or some other form of alveolar disease at the apices of roots.

With the aid of the X-ray and other improved methods, especially those pertaining to the technic of pulp capping, we owe it to our patients to save more teeth from the forceps.

TECHNIC OF PULP CAPPING

If the operation is done upon a tooth that has been aching, upon a pulp that has been exposed by caries where there probably has been a surface abscess, it must be delayed until the abscess has ceased to discharge, and until the inflammation has fully subsided. In such cases

the prospect of maintaining vitality will be doubtful; but our success in a few such cases has been such as to justify the effort, especially in the first permanent molars or anterior teeth in very young subjects, the loss of which would seriously impair beauty or derange the occlusion. When the tooth has been quiet under the usual antiseptic sedatives for some days; when there is no tenderness upon percussion; when dressings may be removed without the detection of foul odors, we may proceed with the operation of pulp capping.

The dam should be adjusted before the removal of dressings, and asepsis maintained from start to finish. The preparation of the cavity should be completed, all cuttings removed with the air blast, and the cavity treated with a dressing of sodium carbonate to remove the lactic acid unless this has been done previously, as we prefer. The cavity should be cleansed and dried with alcohol and is now ready for the pulp capping.

For covering the exposed pulp we make a paste of carbolized resin, and the powder of copper cement or any good oxyphosphate cement.

Fletcher's carbolized resin is our vehicle. (For formula see page 235). A small quantity, a few drops of carbolized resin is put out on a clean glass slab, and the oxyphosphate powder is spatulated into it until the mixture forms a soft paste, about the consistency of softening butter. A small quantity of this paste is applied to the point of exposure and pelleted to place with a bit of spunk (or amadou). When we are sure that we have covered the point of exposure and the thin floor of the cavity with this paste, we proceed to varnish the exposed dentin of the cavity with our antiseptic resin varnish.

The formula for this varnish is as follows:

Violin Resin.....	3iss
Aristol.....	3i
Chloroform	f3i

M.

This will dry sufficiently in a few minutes to receive the cement that is to form the floor of the cavity.

In favorable cases we may use enough oxyphosphate of copper cement to make a good resistant floor, and finish with a metal filling over this; but in all doubtful cases it will be wise to fill the entire cavity over the pulp capping with the oxyphosphate copper cement and keep the case under observation for a year or so. When satisfied that all is well the surface cement may be cut away, and a metal filling may be inserted.

Our success with this method in favorable cases, has been so uniform that we seldom anticipate failure, and in many of our cases we proceed to make a metal filling at once.

When we have decided to make a metal filling at the same sitting, we introduce only enough of the covering cement to make a solid floor to the cavity, smoothing this with suitable burnishers as it hardens so that it requires little or no trimming. Burnishers may be coated with

cocoa butter to keep the soft cement from adhering to them; and the same treatment of the instrument will aid in placing the small quantity of resin paste used to cover the exposure with a very small burnisher coated with cocoa butter. Lift a drop out of the paste, touch it to the point of exposure and push it off with a pellet of spunk held in the points of plugging pliers.

A record of all these cases of pulp capping should be kept for future reference, but I regret to say that I have failed in many instances to do this, permitting the press of patients, the hurry of practice, to prevent the performance of this most necessary duty. The record is necessary, not only for the protection of the patient, but for establishing and standardizing the method.

We now come to consider the treatment of sensitive cavities where there is no exposure of the pulp, but where it is desirable to protect that organ against the irritating effects of the acids of cements, or the thermal shocks produced by high-conducting metal fillings. Such protection should be used in nearly all young teeth where inter-globular spaces are numerous in the dentin; but in cavities that nearly approach the pulp where that organ has been hyperemic, it is imperative.

In gingival-third cavities that usually are acutely sensitive to cut out, the operator may convince himself, if he needs convincing, of the value of this practice of applying a non-conducting non-irritating antiseptic varnish such as our resin-aristol varnish, by the following simple little experiment: Prepare a cavity of this kind, say on the buccal surface of a molar or bicuspid in the gingival third. Let the patient draw a blast of cold air into the mouth suddenly and forcibly on that side; he will tell you it gives a sharp twinge of pain. Now dry that cavity carefully and coat it with the varnish, evaporate the chloroform somewhat with a warm air blast, and let the patient draw in the cold air as he did before; he will tell you he does not feel it. Now, there is no shock of pain. Another test is to throw a stream of cold water into the tooth after cutting out the decay, and if this is as cold as 60 degrees Fahr., the patient will experience a shock of pain. Now dry and varnish, and after evaporating the chloroform, try the cold water test. The pain will be much less, if felt at all. When operating on the anterior teeth, and especially when it is our purpose to fill with synthetic porcelain, the varnish accompanying the package may be used, but if we have a slight exposure of the pulp, the carbolyzed resin cement should be first applied to the point of exposure.

A good clear varnish to be used under silicate cements may be made by dissolving gum dammar in ether with a trace of thymol. The operator may add the gum to the ether until he is pleased with the consistency and then add two or three grains of thymol to the ounce. If this gets too thick from evaporation, add ether. No filling of a conductive or irritating nature should be inserted without first coating the freshly-cut dentin with a varnish of this kind; and it is our firm belief

that the addition of a small quantity of one of the above-named non-irritating antiseptics, aristol or thymol, will greatly enhance the value of the varnish.

No crown or bridge should be set without first treating the stumps with silver nitrate and then varnishing with the aristol resin varnish before setting with cement.

Formula for Fletcher's Carbolized Resin:

R_x Violin Resin.

Carbolic Acid Crystals.....a a 3ss

Chloroform.....f3i

M

METAL BASES VERSUS RUBBER BASES IN PERMANENT DENTURE CONSTRUCTION*

BY J. M. MCMINN, D.D.S., DALLAS, TEXAS

IT IS NOT THE PURPOSE of this paper to present any new methods of technic in denture construction, but to call earnest attention to something which we know already, yet to a large measure, do not practice. It is my aim here to point out, in a manner which will justify your consideration, some of those differences, inherent and otherwise, between metal and rubber, that I may exert some influence in restoring metal to its proper place in denture prosthesis.

Some years ago when vulcanizable rubber made its advent to the dental profession, it was found that this material would answer some of the requirements that the metal base would not answer; it was lighter and less expensive than platinum, gold, and aluminum (aluminum then selling for about \$100 per pound); it could be applied in closer adaptation to the tissues than the swedged metal base; it offered the solution for making artistic contours; and it was not acted on by the oral secretions as the aluminum then was often acted on. Therefore it came into high repute as a base in artificial denture construction.

The profession generally fell into the use of vulcanite, and metal was largely dropped. There were some men in the profession, however, who appreciated some of the qualities in the metal base that rubber failed to supply, viz.: conduction, cleanliness, and strength, and set about to perfect a means of making metal bases that would be adapted to the tissues perfectly. To such men as Drs. Bean, Carroll, Brophy, Taggart, Billmeyer and Campbell belong the credit of solving these problems. These men improvised means of casting the fused metal into a prepared mold, and thereby secured closer adaptation than was possible in the swedged metal base. On account of uncontrollable expansion and shrinkage in a casting so large and thin, these bases were not a complete success until they were also swedged. So today we have the cast-swedged metal base either

*Read before the Texas State Dental Society 1921.

in gold alloy of about twenty karat or in pure aluminum, which answers more nearly all the requirements of a permanent base plate than any other material we have. Perhaps to Dr. Dayton D. Campbell, of Kansas City, is due more credit than any other one man for perfecting the technic of casting and swedging of pure aluminum base successfully. He casts it in a cow bell against an investment cast made from a Spence Compound model, and then swedges the casting upon the original. The technic is simple, and the results are very gratifying.

Yet many of us use nothing but the rubber base. Our patients often ask for something better, and we insist that there is nothing better than rubber. Gentlemen, I am here to say that I honestly believe we are making a mistake; we are failing to appreciate the full meaning of conductivity, cleanliness, etc., in denture bases. In the set of temporary artificial dentures I have no argument to make against vulcanite, but where the work is to be worn through the years, I believe the vulcanite base should be put away and metal should take its place. I have in the past year constructed a goodly number of dentures with metal bases, and the expressed pleasure by the patients who wear them is enough to justify their application, even though no other benefit were to be derived. They say their plates are comfortable, do not burn and draw like their rubber plates did, but feel cool and wholesome, and the sense of hot and cold, which was so noticeably absent before, is just as noticeably restored. Upon inspection I notice also a restoration of pink, healthy mucous membrane, showing that the mouth is being ventilated and exercised with thermal stimuli.

If you lay a board on a plot of grass for any very great length of time, the grass, no matter how green and healthy, will turn yellow, and finally perish; the board shuts off the sunlight. If a pane of transparent glass be substituted for the board, the grass keeps its color and, if given air and moisture, grows on. When a rubber base plate is applied over a mucous membrane, no matter how pink and healthy the tissue is, it will finally lose its normal color, and turn red, turn pale, soften and perish away; the rubber shuts in the body heat. If a metal base is substituted for the vulcanite one, the tissue remains pink and firm and healthy; metal is a good conductor of heat. It is just as natural and essential for the tissues to radiate body heat in order to remain vigorous and healthy as it is for the grass to receive the heat and light rays from the sun.

A more complete understanding of the effects of non-conductivity may be appreciated by wearing a rubber rain-coat on a summer's day, or by wearing a pair of rubber boots. The coat may keep the rain out, but the body stifles from its own heat and feet in the boots swell, and smell, and become tender and painful. The rubber base plate since it covers an area, relatively so small, becomes passive and tolerant and is worn through the years, yet it substracts a value from the worth of the mouth.

Examine the mouths of your patients who wear rubber or gutta-percha plates, and compare them with the mouths of patients in which

metal bases are worn, and the contrast will be easily noted and obviously convincing. Under the vulcanite denture you find a big majority of cases showing inflammation, tenderness, and too often a soft, soggy mouth. The ridges have lost or are losing their bony support, and an abundance of submucous tissue is present. It is a recognized fact, however, that in many cases the loss of the alveolar processes and ridges may be correctly attributed to the ravages of pyorrhea, yet pyorrhea will not bear the whole blame. Irritation, if long applied, causes either an atrophy or an hypertrophy,—in this case, always an atrophy,—and the rubber base supplies the irritant.

Let us note also another condition in making these comparative examinations. Look at the plates themselves. Which of the two materials presents the cleaner surfaces? Other things being equal, metal plates, with the same care in prophylaxis, are much cleaner than rubber plates. The nature of the two different materials is chargeable for this. The rubber base, a vegetable base, though properly handled and properly vulcanized, presents a surface more suited to the adherence of organic debris than does the metallic surface. It may be density or it may be smoothness of surface that partly explains this difference. Gold, platinum, and aluminum are denser than vulcanite, and present a smoother surface.

Mouth cleanliness is the big subject preached upon in our profession in the prevention of diseases. The mouth is the kitchen of the body, and it should be 100 per cent. sanitary. For the sake of health protection, the government requires rigid inspection of all food-preparing institutions: packing houses have their meats examined by a government inspector; canning factories must comply with the regulations of the pure food law; and grocery stores and restaurants hang out a placard license showing their percentage of sanitary conditions. We refuse to buy groceries in a store where the atmosphere and surroundings are not wholesome, and we will not eat at a restaurant where tables and dishes do not look tidy and clean. Yet we ask our patrons to eat in a kitchen which we have made impossible for them to keep clean. To this extent we do not practice what we preach, and we help to defeat the government in its effort to preserve and protect health.

One's standard of dentistry would not be considered very high if he practiced making stationary bridges of vulcanite. In the light of present-day required oral sanitation, he would be charged with the rankest malpractice. Today bridgework of the stationary type is the expression of much thought and effort along the lines of cleanliness. A bridge must not only be strong and efficient, but must be cleanable. The same conditions should be exacted of artificial dentures. They should not only be efficient, but cleanable. If polished metal is more cleanly than vulcanite in bridgework it is reasonable that it is also more cleanly than vulcanite in denture work.

I think there is little room for argument on this point, and I'm sure there is none relative to the strength of the two materials. The argument for the efficiency of the two materials as a base plate, from the standpoint

of adaptation and contour, was, a few years ago, in favor of vulcanite. Today, with improved technic for the construction of metal bases, this argument no longer stands. When it was necessary to swedge the metal base from a sheet of metal, there is no doubt but that it failed to be adapted as closely to the cast as was possible in vulcanite; and in cases where irregularities and undercuts were present, it was almost impossible if not impractical to swedge a metal base satisfactorily. Today with the cast-swedged method of metal base construction perfected, this difficulty is obviated, and the most tedious cases made up in metal, satisfying all the requirements of retention and contour.

Why then do we not use the best material obtainable in our base plates? There is a demand for the best. The public is willing to pay for the best dental work, for it has found that cheap dentistry is the most expensive in the long run, and that the best is none too good. If we hope to raise the standard of denture prosthesis, we shall not only use the best methods of construction, but also the best materials in constructing.

I believe and preach that every patient who expects to wear artificial dentures, should wear at least two sets in a lifetime: a temporary set, and a set which may be considered permanent. The temporary set is worn during the time of normal shrinkage of the jaws after the teeth have been removed, the length of time varying from six to eighteen months. This set is preferably constructed of vulcanite, because its non-conductivity aids resorption, and it is resorption now we want; also because the maxillary and mandibular surfaces of the bases may be added to by bushing to compensate for resorbed tissue. The sanitary aspect over the comparatively short lifetime of the set is not specially objectionable, and the fee for constructing them should be less than for the permanent set. This so-called permanent set should be provided with bases of metal, platinum, gold, or aluminum, for reasons above stated.

I shall appreciate a hearty discussion of my views on this subject, and thank you for your courteous attention.

THIS IS OUR COUNTRY

yours and mine.

We fought for it

Now Let Us Work For It

Rotary Club Members

PLATE WORK*

BY W. C. NEAL D.D.S., ABILENE, TEXAS

THE SUBJECT OF THIS PAPER has come to stay, in my judgment, and it is now engaging the minds of many of our best and most scientific dentists of today.

Notwithstanding all that has been said, written and done in the way of prophylaxis, filling and bridgework, yet people lose their teeth and have to resort to plates as substitutes.

Dr. Geo. H. Wilson said, "If the profession measures up to its full stature, the coming generation shall be spared the calamity of artificial dentures, except in rare instances of accidents." We sincerely hope that the profession will measure up to its full duty, and that his statement is correct, both for the coming generation and the dentists who serve them.

But for this generation the ghost will not down; so all the dentists who have not gone into the "*PRACTICE LIMITED*" business, and left out plate work, will still have to do this kind of work.

It is every dentist's duty to prepare himself both in knowledge and equipment to do the best work that it is possible for him to do in this line.

The dental literature of today is full of the findings of the best and most scientific men of this age on this subject, and *it behooves us to read our Journals*, and put into practice as far as possible the practical and scientific methods worked out by these men.

I refer especially to Gysi, Wilson, Clapp, Tench, Campbell, Hall; many of you know these men personally, and have taken post-graduate courses under one or more of them.

It is not the purpose of this paper to bring to you anything new on this subject, but if I can stir up a discussion and clear the way for a statement of the many difficulties you find in your every day practice, and get from some of these experienced men, helpful hints as to how to get around those difficulties, I will feel well repaid for this blundering effort.

Some one has said that 80% of the plates worn today are made of rubber, and I believe that I might add that 80% of the plate makers of today do not try to make any other kind of plates, and that is why so many rubber plates are worn. Now, as there are so many more rubber plates made than any other, there is more demand for a perfect rubber plate-maker than any other kind.

We all agree, I think, that metal plates are better than rubber, but we can get by with less equipment and less work in making a rubber plate than we can making a metal plate, and we can give it to our patient for less money, and that always suits the patient, so that is one reason that so many fail to prepare themselves with the proper equipment for any but rubber plates.

*Read before the Texas State Dental Society 1921.

Dr. D. D. Campbell, in his course at Dallas last year, taught us how to make plates, from the beginning of the impression to the finished plate; every step is a good one but I cannot take up your time here to give them all in detail.

I will say just here that it will pay you, who have not already done so, to get the little book, *Professional Denture Service*, by Geo. W. Clapp and Russell W. Tench. It is published by The Dentists Supply Co., 220 West 42nd Street, New York. It is free for the asking. It takes up the subject in detail from the examination of the mouth, and carries it through to the finished plate, giving 222 cuts explaining every step. It is not Dr. Campbell's method exactly, but differs in only a few points.

Dr. Campbell uses S. S. White Impression tray Compound for taking Impressions, finishing with plaster.

In taking the finished impression for the upper, he cuts a hole in the palatine portion of the tray to allow the plaster to escape; you are less liable to get air bubbles, and I think you get a more uniform pressure over all the surface.

In taking the bite, he first makes a base plate of Graft's base plate material; on these base plates he builds a rim of wax from heel to heel, about half an inch high, places the plates in the mouth and trims wax for occlusion; trims until the patient can move the mandible forward and back and from side to side, all the while plates being held firmly in place, and the wax rims in perfect occlusion.

I find a good way to get this is, to put soap or glycerin on one of the occlusal surfaces; then with a hot spatula warm the surface of the other and let patient close lightly and rub forward and back and from side to side; in this way you will soon have a flat surface, all parts firmly together in any position the mandible can be moved. Then set up the six anterior uppers giving them the proper contour, length and position. Cut out wax on the lower for the six anteriors; this leaves a block of wax on both upper and lower base plates, then pool the wax on lower; that is, melt the center of the block with a hot spatula leaving the edges firm enough to hold the soft center; then place one tooth on lower about the center for a stop; put plates in mouth and let patient close until this lower tooth stops the bite, this will stick the wax together in posterior part. Remove and mount on articulator.

Set up the teeth and try in mouth for any correction that may be needed in articulation.

Vulcanize and finish plates, and try in mouth. Take a rim of soft wax and cover the occlusal surface of one of the plates and let patient bite through the wax; you will be surprised to see how few cusps come through the wax; with a small stone in engine grind off these high cusps a little and try again; after grinding until you have what you think a fair occlusion, take bite the same way and mount on articulator and grind with carborundum and glycerin. Dr. Gysi advises this last grinding with the

abrasive in the mouth; I believe it the better way if you can get patient to do it.

In finishing plate let it cover all surfaces possible just so it does not interfere with the muscles. In dismissing your patients I think it well to advise them how to use their teeth in the beginning, and that is, not to try to grind on them, but chop—up, down—and do that slowly; they will give the grinding motion soon without being told. I think patients often expect too much of their teeth in the beginning, and many times are discouraged because they cannot get the same service with their teeth that their neighbor does with his, when probably he has been wearing teeth for years.

And one other suggestion, that is, be sure you collect your bill when you deliver the plates.

If the bill is paid and the plates need some adjustment they will come to you for it, but if the bill is not paid the trouble is often delayed, and sometimes magnified, then dissatisfaction, and sometimes the refusal to pay the bill at all.

The best pleased patients are those who pay their bills before leaving the office.

CAST ABUTMENT FOR BICUSPIDS*

BY F. S. OSBORNE, D.D.S., COLUMBIA, TENN.

THESE ABUTMENTS ARE CHIEFLY USED for bicuspid and cuspid. With small knife edge stones the tooth is squared up on lingual, mesial and distal and the lingual cusp is shortened, deepening the occlusal groove mesio-distally allowing it to extend down the sides mesio-distally for anchorage. The final dressing of the abutment is done by cylindrical mounted stones in right angle.

For better anchorage a small pin is placed in lingual cusp. With abutment prepared, take copper band of proper size and fit it to gum line and cut out the buccal surface so there will be no undercuts. Fill band with modeling compound and press into position; remove and cut away excess, then warm and press in position again. When chilled remove and mix Spence's plaster and pack in impression; when hardened remove compound and wax up with sheet casting wax; insert sprue and invest. When cast is made you have an ideal abutment for a live tooth that does not show any amount of gold from the buccal.

*Given as a clinic before the Tennessee State Dental Society, 1921.

THE DENTIST AND HIS DOLLAR*

BY G. E. HARTER, TOLEDO, OHIO.

DR. W. S. ROSENHEIM, TOASTMASTER: We have had with us in times past business men who posed as professional men, and professional men who posed as business men. At this meeting we have with us a man who claims to be only a business man; but he is one who is very much interested in the dental profession. I do not need to introduce him to you. You all heard him yesterday, and I know we shall all enjoy listening to him again. Mr. Harter.

MR. HARTER: There are just a few points I would like to give you, in addition to those mentioned in my talk yesterday. Most men make more money by being in debt than in almost any other way. One day a very rich man whom I knew very well came into my office smiling all over, and said: "Harter, today I am worth a million dollars. I have enough. I am not going to try to add a dollar to that million." I asked: "What are you going to do with your million?" He said: "I'm out of debt now; I don't owe anybody a cent; so I can't use any of it to pay debts. About the only thing I want is eggs three times a day. I can have them now, if they cost me a dollar apiece." He had no wants but eggs; he knew of nothing he could do with his million except to buy eggs no matter what they cost. You see, he had traded his soul for that million; lost his vision. But that's not the point. That man came back to my office about a month later, and said to me: "Harter, I borrowed a thousand dollars today." I asked him what in the world he wanted with a thousand dollars. He said: "I wasn't just comfortable. Every dollar I ever made I got by saving to meet a debt *on the day that it was due*. So it seemed unnatural to be out of debt, and I borrowed a thousand. Now, I'm going to save out of my expense-money to meet and pay that debt, and I'll feel more natural."

Now, I say to you men who want to get along financially: Cultivate a hatred of debt; learn to think of debt as your enemy, as a load upon your shoulders, as an incubus that you must get rid of as soon as possible. Something like the case of Sinbad the sailor, and the Old Man of the Sea. After you have acquired a sincere and genuine hatred of debt, then borrow all the money that you can use profitably. There is no contradiction in those statements. You can make money by being in debt, provided that you dislike being in debt, because you will save and save by denying yourself something, some pleasure, that you do not need, so that you can pay that debt on the day that it is due. If you have learned to hate a debt, you will be glad to get rid of it—and then create another.

If you can borrow money at six percent and invest it or put it to work for you in such manner as to make it earn seven, or eight, or ten, you are making money by your shrewdness and care in using money—and you are

*A Talk at the Banquet Session of the West Va. Dental Society. Tuesday evening, April 12, 1921.

making money by using other people's money. You do not need to wait for years to accumulate capital to invest. As soon as you have built up for yourself a financial character, other people will be glad to loan the capital, because you can make it earn something for them, and for yourself also.

Borrow money from banks or from almost anybody except from a relative or very close friend. Neither lend nor borrow to or from relatives or intimate friends as a business proposition. Do both, of course; but not on a business basis; just as a little social accommodation, such lending and borrowing are all right enough; but as a business matter, borrow money in a business way from people who make a business of loaning money.

When you want to borrow money from a bank, go into the bank as though you were going to buy a beefsteak. Head up! Banks are in business for the purpose of lending money. Loans are their stock in trade. But for loans banks could not exist. They are as anxious to lend money as you may be to borrow it. They very much want to lend money; but they want to be very sure that the loans they make will be paid. Banks have but little money of their own to lend. They lend other people's money, usually. And they must be careful. They try to make loans only to men of good financial character, for banks aim to lend money on character, not alone on collateral. They want the collateral, of course; but what loans rest upon is the financial character of the borrower.

Paying debts when they are due builds financial character as well as reputation. Upon financial character rests the ability to borrow money when it is needed.

You should know some banker very well, and some banker should know you. Such an acquaintance may be very valuable to you at almost any time. One good way to have a banker know you is to instruct your supply house to collect your monthly bills by draft through a bank named by you. There was a time when many dentists were offended if their dealer drew on them through a bank. That method of collection does not imply a question of your credit. It is a very common thing among business men. If drafts are drawn upon you through bank and you meet them promptly, it will not be long before the people in the bank learn to know you and regard you favorably. You build a financial character and reputation by paying promptly; and when the time comes that you want to make a loan, perhaps to buy a home or new equipment, you go to that bank, where you are known, and your reputation, based upon your financial character, gets the money for you. You may be surprised, sometime, to learn how easily you can borrow money.

Rev. Dwight Hillis went from Chicago to Brooklyn, and started a new church in Talmage's old tabernacle. He got in with some shady fellows who induced him to lend moral tone to a blue-sky concern, and a lot of his friends sunk their good money in it. The concern failed, of course; that was what it was meant to do. Then Hillis went to work, and in a few years he cleared off all the debts of that fake concern. That fact became well known in financial centers. Wall Street papers printed it. Sometime later

Hillis saw an opportunity. He went to Wall Street and asked for \$200,000. He got it merely by asking for it, on no name but his own, simply because he had paid those old debts for which he was in no way legally responsible; because his action showed that he felt morally responsible and accountable, and acted accordingly. *It is the feeling of moral accountability that makes financial character.*

You never need hope to succeed unless you live in the most intimate acquaintance with your income. Get acquainted not only with the twenties, tens and fives, but also with the dimes and nickels. It is nothing to your credit financially to own the reputation of being a free spender. Never emulate your wealthy or spendthrift neighbors for the sake of keeping up appearances. There is nothing in that for you. You may cut quite a swell by spending two or three times your income, but you never can build a financial reputation in that way; and you may find that bankers know more about your money-habits than you think they can know when you attempt to borrow money from them.

Be very careful of your investments. Never make an important investment without consulting some banker or business man. Such men may see things in such transactions of which you never thought.

Really good things are not at all likely to come your way from any great distance. There usually is money enough right at home to float really good enterprises. Good things are not likely to come to you from Colorado or New York. Good things are sought for, and usually are snapped up as soon as they appear. I talked with a man today who is here for the purpose of organizing a \$500,000 company. He tried to buy out a large established concern and they refused to sell, and he said to me: "Now, I am going to organize a new company here, and will have the stock all subscribed within a week, right here in Bluefield." He is known as a successful organizer of good concerns, and it is likely that he will have no trouble in getting together the necessary amount.

Build a credit, and your credit will keep you in your old age.

Not long ago a dentist died in a northern State. He had been successful so far as a good practice was concerned. His executor found in his safe securities of a face value of \$40,000 for which that man had paid par and above par. He had paid a thousand dollars on one of his investments within a week of his death. Not one share of all that stock was worth more than it would bring as so much waste paper. He had been busy all his active life in buying gold mines, oil wells, rubber plantations and such stuff—for the other fellow. Some of this stuff promised immense returns—but it was all promise. Better be content with something at home that does not promise quite so much, but keeps its promises.

Always talk turkey to your banker. Be perfectly frank with him. Tell him why you want to borrow the money; what you intend doing with it; how you expect to be able to repay it. Always remember that a banker is a guardian of other people's money, and that you are asking him to trust you with the use of it.

Honesty isn't all there is in financial character. There must be that, as a basis; but there must be industry, application, some self-denial, much determination, and not a little careful calculation. Cultivate all of these things.

In times of depression, loans are scrutinized very carefully. A banker recently said: "There is plenty of money, but credits are d.....d poor." The present price of real estate is about one-third wind. So, many bankers will not loan money with which to buy speculative real estate. They will not loan money to be invested in automobiles. They will loan money for homes, and for what they consider necessary business purposes.

THE TEACHING OF MOUTH HYGIENE IN THE PUBLIC SCHOOLS

BY G. C. HOWARD, D. D. S., WEST UNION, W. VA.

IT IS PRETTY HARD for a professional man to talk on a subject or introduce legislation pertaining to the profession he practices without the public conceiving the idea he is doing it for the profession or his own personal benefit. Permit me to say I am not in the Legislature for personal gain or honor, have no political aspirations, but to tell you the truth, I am especially interested in the life and health of the boys and girls of West Virginia.

In looking after the bigger things of County and State, I am afraid we have overlooked some of the smaller things, which are really justly and **aruly** the greatest of all. One I am sure you will agree with me is the life and health of our boys and girls. We owe it to them that they may have a strong physical body, and thereby be the better enabled to go out and fight the battles of life and reach the highest points in educational attainments, making better men and women, and last, but not least, better citizens. You will notice that I put health first before you apply the mechanical, because without a good strong physical body you cannot attain the highest standard of scholarship, especially if the pupil is disturbed with aching teeth and abnormal oral conditions. The teeth lay the foundation for the health and strength of mankind. It is the teeth that first receive, work upon and prepare the food that is the fuel of the body; then the first and greatest step to good health is to have good teeth.

It is to be deplored that the number of persons who realize the value and appreciate the comforts of good health is so small. Only eight percent of the population of the United States have a true conception of the value of the teeth, and pay proper attention to them. The other ninety-two percent are content to go through life with deformed faces, unsanitary and unhealthy bodies, and suffer great pain because they are ignorant of the true functions of the teeth, or are too neglectful and careless to give them the required attention. This is just to give you a little idea of how the peo-

*Presented at the banquet, West Virginia State Dental Society, 1921.

ple regard one of the greatest assets to the comfort and well being of one's life and health.

From a health standpoint it is more important that the child's teeth be brushed after each meal than to wash the face on rising, although we will admit both are essential.

True it is a clean tooth never decays, and that statement would seem to be quite important enough of itself, but when to that knowledge is added the further fact that clean, well kept, properly cared-for teeth mean the health of the entire body and its immunity from the attacks of diseases of many kinds, the importance of the subject becomes paramount to all of us. The care of the mouth and teeth is the one great duty that each one of us owes to himself, that each parent owes to his child, that each teacher owes to every pupil, and every educator owes to those under him and about him.

Every child is entitled to the privilege of growing up healthy and strong. Don't wait for your child to outgrow this condition. Help the little fellows to get all there is out of food and out of life. Look over the reports of the medical and dental inspectors in the public schools who have made but a glancing examination of the mouths, and you will find that decayed teeth outrank all other physical defects combined. Such mouths and teeth breed disease; such children cough and sneeze millions of germs made virulent and active in an ideal breeding ground. Then again, the teeth are a crushing, masticating machine, and are frequently ruined by the time the child has reached twelve or fourteen years of age. It is true they can limp through life with this dreadful handicap, just as an automobile can climb a hill on three cylinders, but you can rest assured that a child with wrecked teeth at fourteen is traveling on his second speed until he reaches thirty-five, and from there on he drops into low gear to finish the journey in a slow and uncertain state.

A chain is no stronger than its weakest link. Mastication, digestion and assimilation—there is a three-link chain. If we weaken mastication by losing or injuring the teeth, we have weakened the one vital link of the chain upon which our health and lives depend.

The first asset the State and Nation has is its boys and girls. Why not teach mouth hygiene in the public schools?

THE PSYCHOLOGICAL LAW OF ANESTHESIA

BY BERNARD FELDMAN, D.D.S., PATERSON, N. J.

(Written for THE DENTAL SUMMARY)

(While not necessarily endorsing any of the deductions of the author of this series, the Editor and publishers believe that, in the interest of the advancement of science, the work of all sincere investigators is deserving of consideration by the largest possible group of intelligent men and women. It is in this spirit that space is devoted to these articles by Dr. Feldman, even though they may be considered by some as rather remotely related to dentistry.—G. E. H.)

(Continued from page 155 February DENTAL SUMMARY)

14

THE NUMBER "SEVEN" IN NATURE

ENOUGH PROOF HAS BEEN FURNISHED by scientific metaphysicians to satisfy their materialistic confreres—

One. That the form-aspect or "etheric double" is a physical reality, since it can be photographed after its separation from the entranced visible molecular body.

Two. That an intimate connection remains between the ordinarily invisible astral body and the physical hulk of matter, is proved by the exteriorization of the senses.

Three. That this connection between the two bodies is furnished by a mysterious psychic force the existence of which can no longer be doubted, for it can be drawn along a wire, it can be stored and measured, it can move objects without *visible* contact, etc.

As we shall have occasion to refer later to these important findings, the reader is asked to keep them in mind, as they will play an important part in revealing the mechanism which controls the phenomenon of anesthesia. Such superphysical phenomena presuppose the existence of superphysical ethereal planes of being, in order that such finer vibrations can take place harmoniously, if at all. The existence of "sound" presupposes the existence of an etheric medium in which such vibrations may take place to produce the sound. Without such an etheric medium which pervades the globe, there could be no sound. Occultists say that there exist other finer gradations of the *same* ether, interblending this ether of space, which is septenary, like everything else in the universe. As the occult doctrine postulates: "All substance or matter is manifested in Nature upon a *seven-fold* principle, employing a *three-fold* vehicle. From worlds to atoms, the law is the same, and we find that each atom has *seven* planes of existence, and each plane is governed by its specific laws of evolution and absorption." (See foot-note No. 3.)

In Man, this is beautifully illustrated in the three vehicles or carriers: *Spirit, Soul* and *Body*, which are blended completely with four other "prin-

Foot Note No. 3—"Each of the seven fundamental planes or layers in space has its own objectivity and subjectivity, its own space and time, its own consciousness and set of senses.

"We have a different set of senses in dream life, have we not? We feel, talk, hear, see, taste and function in general on a different plane, the change of state of our consciousness being evidenced by the fact that a series of acts and events embracing years, as we think,

ciples" or aspects to complete the *septenate that is universal in Nature*. And so we can take the smallest or grossest substance, and we will find that there are several gradations—seven in number—which range from materiality up to spirituality, balanced and equilibrated by the third or middle principle.

It would necessitate the writing of an essay to adequately discuss the mysterious Law of Seven, illustrating how Nature carries out universally its seven-fold principle, using a three-fold vehicle. *Everything in this world is a trinity, completed by a quaternary*. The potency of numerals and their symbolizing the immutability of Nature's laws was known by our ancient philosophers, such as Pythagoras and Plato, who regarded *Numbers* as the best representation of the laws of harmony which pervade the Cosmos. A more explicit affirmation of this doctrine is furnished by modern science, while recognizing that all the higher laws of nature assume the form of quantitative statement. In chemistry, for instance, the doctrines of atoms and the laws of combination are arbitrarily defined by numbers.

The Septenate is universal throughout Nature. In keeping with this eternal law, Man is a trinity (spirit, soul and body), completed by a quaternary of principles, which *seven* interpenetrate each other so completely as to be considered as a unity. In further keeping with this law, Man lives in three distinct worlds (i. e., physical, astral and mental), which occultists claim are the vehicles of four other etheric zones. Man lives in these three worlds because his three "vehicles" are so attuned that they can vibrate harmoniously to render him a conscious entity. Man already possesses in his body the various types or gradations of matter which are attuned to the gradations of matter comprising these etheric zones; so that by means of his physical matter, Man can keep in touch with the physical world; by means of his ethereal principles, he is in touch with the astral or etheric; and by means of the remaining spiritual principles, he can receive vibrations from the mental world. When the Man thinks, he is using the ether of the mental realms; when he sleeps, he lives consciously in astral realms which have a finer gradation of ether as compared with the ether of the physical plane, which latter permits of the various types of vibrations we call light, sound, etc. *The Ego (the Man himself) can work up and down the various planes*, because each of the seven states of consciousness corresponds to each of the seven spheres which are commonly known as the three higher and the four lower planes of consciousness.

Just as matter stands in relation to spirit as the extreme poles of the

passes ideally through our mind in one instant. This extreme of our mental operations in dreams, and the perfect naturalness for the time being, of all other functions, show us that we are on quite another plane.

"Our philosophy teaches us that there are seven fundamental forces in nature, seven planes of being and so there are seven states of consciousness in which man can think, live, remember and have his being. Two such states are the waking and the dreaming, and furnish good proof that such states differ. We stop at the fourth plane of consciousness, finding it impossible to go beyond with any degree of certainty.

"There is but one *real* man enduring through the cycle of life and immortal in essence, and this is the Manas, the Mind-man or embodied Consciousness."—H. P. Blavatsky.

one substance, so does the physical part of man stand to the Spiritual Individuality. Together these two make up the whole of Man's septenary unity. His immortal part is his *Individuality*, comprising the upper three of the seven principles; the "lower four" belong to the four lower planes and therefore disintegrate sooner or later into their simpler elements; they comprise his *Personality*. It remains for Man himself, by his individual effort, to attune his inherent principles to the three higher planes, by spiritualizing his Ego, and awakening the upper seats to life and activity.

Have we not furnished sufficient scientific proof that Man has an invisible, or *spiritual*, counterpart of his physical body? *This spiritual counterpart is extremely important in our discussion because it is this "self" which is consciously active while the Ego has temporarily left the anesthetized physical body.* The sleeping person has a consciousness quite separate and distinct from his ordinary consciousness; he is the same individual in a different and higher phase of his being. And such a plane can be reached by mesmerization, by anesthetization, by electrocution, or by a physical blow or pressure.

15

THE SEPTENARY NATURE OF MAN

Thus, we find two distinct beings in man—the spiritual and the physical; the man who *thinks* (showing his Higher Self), and the *same* man who records as much of these thoughts as he is able to assimilate, (showing his lower nature). Therefore, we divide him in to two distinct natures, the upper or spiritual being, composed of three "principles" or *aspects*; and the lower or physical quaternary—making *seven* in all. Briefly enumerating them they are, as follows:

- (1) Physical Body
- (2) Life, or vital principle
- (3) Astral Body
- (4) Animal Soul
- (5) Mind, Human Soul
- (6) Spiritual Soul (Intuition)
- (7) Spirit-Man (The Self)

The sixth principle in Man, (intuitional knowledge or enlightenment), is a mere breath in our conceptions; yet it is still something faintly material, when compared with *abstract* divine Spirit, of which it is the carrier or vehicle. Universal spirit is the source of all life and consciousness. Strictly speaking, it is not a principle of Man, but is the divine essence which has no body, nor form; it is imponderable, invisible and indivisible. Together, the sixth and seventh principles constitute the Divine Duad, yet they could not *become manifest* unless they employed a still more material principle, and the fifth, mind, serves as this vehicle of manifestation. Together, these three comprise the Upper Three, the immortal part of man—his Higher Self.

The conscious Ego is one of the fractional aspects of Seven, which is the root of human consciousness, and whose source comes from the Uni-

versal Spirit. What this Universal Spirit is we cannot know, except to describe it as Absolute Consciousness, or Spirit-Matter in its absolute infinitude. We can only know it through its manifestations, through eterna, substance in its endless forms and degrees, from the finest to the grossest. We can trace the atom from the cell, and its molecules; we can go further and trace the electron and the ions. Electrical science has traced the electron as far as its component negative and positive elements, which are constantly repelling and attracting each other, and by this action convincingly proving that there is *life* and *intelligence* in every atom in the universe. What imparts the energizing power that keeps them constantly pulling and pushing each other, if not the Radiation of the One Absolute, which, as Atma, pervades the whole body of Man through his various vehicles, permeates his every cell, thereby giving consciousness to each cell, and making each cell in the body, a *mind-organism*? *Atma, therefore, is consciousness*, and the "seven principles" of Man (except the body, the life-principle and the astral body, all of which disperse at death) *are simply aspects or states of consciousness*. Life will be found, in its final analysis, to be electrical, and the result of *harmonious vibrations* which come from the atomic forces of the same planes.

To express the same idea in words which everybody can recognize as necessarily true, Man possesses besides his cellular (physical) body, (*one*), certain other "principles". First comes Life or his "vital-principle;" (*two*), then comes the Form-aspect (*three*), as there can be nothing material or substantial without form. We next recognize the desire-principle, (*four*), some people expressing it in animal passions and desires whereas others have more ennobling or higher ideals; here must be this intellectual or *mental-principle* to distinguish Man, the Thinker, from all other animals; (*five*), yet we know that mere thinking is not *reasoning*; aided by his intuitive principle (*six*), this reasoning becomes Knowledge. Of course we must have the Individuality—the Knower—and this knowing faculty is Atma (*seven*). Compare these numbers with the above, and there you are! There should be no trouble for anybody to understand how Man represents a regular scale of principles from *Meta-spirit* down to grossest matter.

16

THE EGO

While loath to accept "soul" and "spirit" officially, Science has nevertheless been forced to give a certain name, which can be found in every textbook, to distinguish the Inner Man from his physical hulk or tabernacle. This name is the "Ego."

Philosophy and logic postulate that there is nothing in the whole world that has not two sides—obverse and reverse of the *same* medal. Applied to Man, particularly, this truism is further corroborated by *all* the sciences: "*Man has his psychical aspect which vivifies his physical body by means of psychic force or energy, emanating from the absolute consciousness or the Infinite Mind.*"

Every advance made by modern science is in keeping with this law; there has been nothing advanced to disprove its universality. Who can tell what the future years have in store for us—remembering for how many years the atom stood as the finest division of matter? Today, electrical science has even made a diagram of the course of the X-ray (Steinmetz); its researchers concede that energy (or spirit in a coarser gradation) is electrical in nature (*See foot-note No. 4*); the greatest *unknown force*, *i. e.*, superheated steam, is being proved by Prof. Robt. C. H. Heck, of Rutgers to be electronic also. Better methods of analysis, finer physical equipment, (as in the case of the ultra-microscope and the high violet ray, as well as improved staining methods) have made possible these advances in our knowledge.

Advanced chemists are predicting that the morrow may see these methods of analysis so improved as to greatly extend our knowledge, and to make finer analysis possible and easy. (*Foot Note No. 5*)

No one will deny that the human being is possessed of various forces, *i. e.*, magnetic, sympathetic, nervous, mental, etc.—every kind of force. These physical forces are all biological in essence, seeing that they intermingle with and often merge into those forces that we have named intellectual and moral—the first being the vehicles, so to say, of the second

Foot note No. 4—Centuries ago, Democritus, of Abdera, called the invisible substance with which space is crammed, *atoms*, which “by reason of their solidarity, can experience neither change nor alteration.” John Dalton brought forth these views and elaborated upon them during the middle of the fifteenth century. The very latest views on the subject are presented by Mr. Albert C. Crehore, the eminent electrical engineer, who says:

“The discovery of the electron and the isolation of it, so that its properties might be measured, marked a new era in our conception of matter. The fact that each electron always carries an electrical charge of the same amount is most significant. It has led by natural steps to the present electrical theory of matter.

“The value of the unit or *quantum* of energy has now been experimentally determined. It is excessively small, but, when a quantity can be measured at all, its existence is not questioned. Its existence is now regarded as experimentally established.

“Progress by the use of this new idea was very marked in every direction as regards atomic phenomena. The present trend of physicists is to generalize this idea, and to say *that energy is essentially of an atomic nature, being composed of units in the same way as matter is composed*. There is danger in thus generalizing in advance of definite proof, and we cannot say that the sum total of electrons in the universe remains constant.

“According to the Rutherford-Bohr theory, an atom is a structure composed in part of a charge of positive electricity, the centre of which is the geometrical centre of the atom. This charge is supposed to have small dimensions compared with the size of the atom, or even of the negative electron. Around this nucleus one or more negatively charged electrons are supposed to be describing approximately circular orbits, the radii of which are very large as compared with the radius of the electron itself. There may be several electrons describing the same orbit at the same time. They would then distribute themselves at equal intervals around this orbit *on account of the mutual repulsion they have for each other*, thus forming a ring of electrons. (These italics are our own.) The atom may be composed of several such rings all circulating around the same nucleus.”—(Proceedings of A. I. E. E., April, 1918.)

Foot-note No. 5—“Consciousness is a function of the spiritual organism. It is no more a function associated only with the physical brain than music is associated only with the mechanical keyboard. A piano furnishes music only under the touch of the musician. The physical brain manifests consciousness only under the impulse of the spiritual man. When the spiritual man withdraws from the physical mechanism, the brain ceases to transmit consciousness as a piano ceases to transmit music when the player withdraws.”—LILLIAN D. WHITING, “*The Adventure Beautiful*.”

No one who does not deny soul in man would hesitate to say that their presence and commingling are the very essence of our being, that they constitute, in fact, the *Ego* in man. The *Ego* or *soul*, is the battleground in man, between the spiritual forces which aim to lift him higher and the material things in earthly life, which drag him down. In the former case, he is illuminating his soul with the spiritual consciousness of *Buddhi* and *Manas*, and thereby gaining an immortal Individuality, or a divine *Ego*, which is the omniscient Deity *within himself*. This Self is a distinct entity, and possesses the powers already mentioned under Section 9. So that what man *wills*, that does he become; many things come by *push* and *effort* that are attributed to the Almighty. Such effort to be effective must be consistent, employing enough energy and perseverance. Every thought, every action becomes stored up and constitutes the *Sum-Ego* or *Ego-Sum*. All the experiences that have been garnered in the consciousness—that is really the *Ego*.

So we can, for purposes of study, say that the *Ego* has a Higher and a Lower Self. Illumined with spiritual consciousness, the Higher Self, it becomes the *Human Ego*, and speaks by what we know as the "voice of conscience" to the Lower Self, and employs the subconscious nervous system as its instrument of communication to finally reach the physical brain.

Our waking consciousness is more directly under the control of the Lower Self. This division of the *Human Ego* into a higher and a lower self is an arbitrary one, inasmuch as they interpenetrate each other so perfectly as to be considered as the one *Ego*. Just as we have differentiated between the seven principles that make up the *Man*, so can we separate the *Human Ego*—the *Real Self*—from the vehicles which he uses and from the garments, the body, with which he is clothed. Yet it must be understood that if we do make these divisions, it is done for purposes of study, and that the Self is one, and that his consciousness is a unit. Thus, when we speak of the three phases of the *Human Ego* which proceed severally from his three aspects, viz., of *knowing*, *willing*, and *energizing*, we must not forget that there is no division of substance, nor are these functions wholly separated. When the *Ego* knows, he also wills and acts; when he wills, he acts and knows; and when he acts, he wills and knows. One function may predominate sometimes and wholly veil the others; but there is one indivisible whole manifesting itself in three ways.³⁶

The *Human Ego* can, therefore, be defined as the Self which is the conscious, feeling, ever-existing One that in each of us knows himself as existing. The self-affirmation, "*I-am*," comes before everything else, stands above and beyond all argument.³⁶ The hulk of matter known as the physical body, which changes itself completely once in seven years, cannot be this thinking, self-affirming *Man*. Neither can the next of the seven principles, known as the vital-principle, be considered as the real *Man*, any more than the steam of the locomotive's boiler is more than a

³⁶ Annie Besant, "Lectures on Psychology."

powerful force. *Both need an intelligence to guide and to control them.* And so occultists claim that this intelligence must be possessed by the highest spiritual body or *aspect* of Man, and that consciousness is, therefore, Man's spiritual manifestation through his several physical vehicles. It is the Manas or Mind principle with which the Higher Ego is endowed that makes the latter the Real Man and distinguishes him from all living animals in the universe.

We come back to our former statement that Man is a two-fold being, the product of two (physical and psychical) lines of descent. His physical organism and the animal instincts and desires can be traced back to their analogies in the animal kingdom; but his essential Consciousness comes from a higher source and links him with the Divine. From the latter, Cosmic Ideation, or spirit, comes our consciousness; from Cosmic Substance or the matter called physical body come the several vehicles in which that consciousness is individualized and attains to self-consciousness.³⁵

Consciousness cannot be resolved into the secretion from the gray matter of the brain. The brain-mind is only one of the aspects of the permanent underlying unity of consciousness, differentiated for the garnering of experience in terrestrial life. For the objective phase, it needs organs such as the cerebral brain with its physical senses, to bring it into touch with the material world. The brain is but the instrument which the Ego uses to manifest thought-vibrations; it is the product of constant functioning with thought-ether by the Thinking Intelligence, the EGO. For the subjective phase, the Higher Ego has the power of acting without the co-ordination of the physical organs and brain, as we have mentioned in Section 8. Both phases make up the One consciousness. It is important to repeat that there are not two separate sets or systems, but only two phases of the *one* system.

17

THE TRUE SEAT OF CONSCIOUSNESS

So that our Ego has a consciousness, just as it has a nervous system to manifest its dual nature, described under section 8 as objective and subjective. We have a spiritual consciousness (using the subconscious mind as its instrument of functioning) which is illumined by the light and essence of the Spirit, and a lower or sentient consciousness which is inseparable from our physical brain and senses. Being material enough in its nature to belong to Earth and being held in subjection by the physical brain and senses, this lower consciousness must of course fade out and finally die with their disappearance. It is only the spiritual consciousness, whose roots lie in eternity, which survives and lives forever. *It is this higher consciousness which displays activity while the body is asleep or paralyzed.*

The reader can now understand the reason for our elaborating upon Man's seven principles, upon his subconscious mind, upon the psychic

³⁵H. P. Blavatsky, "Isis Unveiled"; "The Secret Doctrine".

or nervous force which constitutes his life-principle, and other occult or esoteric doctrines. *We claim that the true seat of consciousness does not lie in the physical brain, as is commonly supposed, but is to be located in the Higher Ego, or Man.* We realize what a revolutionary assertion this is, and we expect it will arouse no end of comment and adverse criticism. But we will stick to our guns, and leave it to future scientists to reveal the Truth.

Yet a moment's serious reflection should serve to dispel forever the illusion that our physical body is our real body, while our physical brain is no more nor less than *an instrument* to be used by the Ego, or the Inner Self.

Take the person who has just died; what differentiates him from the living being which he has just ceased to be? Organ for organ, nerve for nerve, brain for brain, they are alike. Yet from the cadaver *the Life-principle has flown* and what is left is but a hulk of flesh and bones which will decompose into its physical elements. We defy any scientists, who deny the existence of spirit, to give to this decomposing remnant of a once-elaborate mechanism, this glorious Life-principle which emanates from the *Infinite Spirit*. This psychic force (which acts as a conductor much the same as an electrical current is transmitted through a copper wire by the intelligence of an operator), is the connecting medium between the immortal part of Man or his Higher Ego, and the instrument typified by the physical body or its brain. The Higher Ego supplies the intelligence of the sender, the Life-Principle is the electric current, and the physical body and brain can be likened to the copper wire or instrument. (*See Foot-note No. 6*)

We conclude, therefore, *that to Spirit is referable every manifestation of consciousness.*³⁵ Through the medium of the Human Ego, this sentient principle or quality of the soul, which is consciousness, is transmitted to the physical brain and nervous system of man *by means of the psychic force or nerve aura*. In the course of evolution, consciousness has gone a little ahead of its organs, and the workings of consciousness has brought about the building of these organs. The function of life always precedes the shaping of the organ which is built up by the continuous exercise of the function.

The connecting link between the brain and the true seat of consciousness is the nerve aura, and it is the real medium for the conveyance of consciousness or will. It is wholly along the nerve aura that the message of sensation is conveyed. As all natural forces are fundamen-

Foot-note No. 6—"Examining an infinitesimal particle of radium through the spinthariscopes, furnishes a beautiful sight in the continuous bombardment of small illuminated bodies which come from it. It is like fire-flies flitting around. We can trace the emanations of radium showing the electrons and the actual definite magnetic path which they take. Observations taken over a period of 100 years show absolutely no diminution of wave length or strength of the minutest particle of radium, and it may take a thousand years to make the least difference, and maybe not even then." S. C. COOPER—Western Union Tel. Co.

tally alike when traced to their Source, it can be controlled or modified by various influences, *i. e.*, electrical, chemical, mesmeric and physical, they all eventually produce the same psychic effect on the nerve cells. So that nothing transpires in connection with the patient's arm, let us say, but what is reported to the true seat of consciousness which resides in the soul and the Higher Self. The only portion of the patient's aura which cannot be thus dominated has to do with the involuntary movements in the body, such as the action of the lungs and heart, and Nature happily guards the patient from the stoppage of the vital machinery during the subjective condition.

18

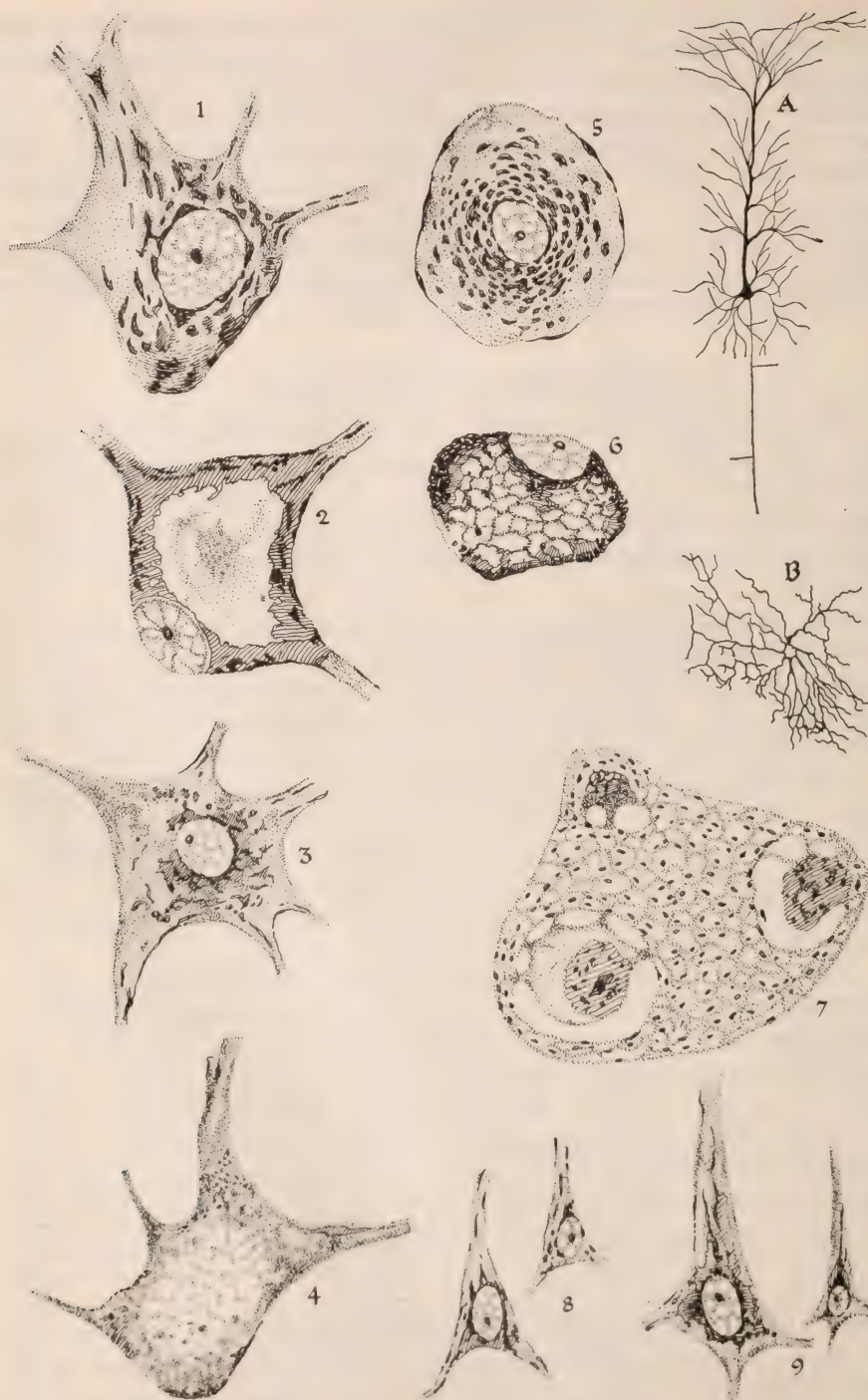
THE NEURON AND ITS DENDRITES

We can now proceed to supply the final link in our chain to connect the vital impulses which emanate from the Infinite Mind with the neuron system of nerve cells of Man. No one needs to be told that the nerves are the lines of communication through which the human mind receives intelligence from and issues its mandates to every part of the body.

The essential elements of the nervous system are the nerve-cells with their prolongations, the nerve fibers. The nerve cell or neuron consists of a cell body and two sets of fibers, designated axons and dendrites. The nucleus lies within the cell-body and there is but one axon (conveying *efferent* impulses) to many dendrites (*afferent*).

The chief function of the neurons is the conduction of impulses and its transmission to another neuron, to a muscle or to a gland. Beyond this activity, and self-nourishment, we have no conclusive evidence of any other important function of the nerve-cell.¹² It is, however, highly specialized to the greatest efficiency for the psychical purposes entrusted to it. (*See illustration, page 256*)

The neuron receives the impulse through the dendrites or afferent fibers, of which there are many, and sends them through the cell-body where the current becomes intensified while passing through it, and sends them out through the single axon or efferent (motor) fibers. Both axons and dendrites may have many branches like the rootlets of a tree. Thus, in certain parts of the nervous system, the terminations of one axon may be in contact with the dendrites of the cell-bodies of several neurons. And, conversely, the branches of a dendrite may be in contact with several axon branches of several nerve cells. As many cells have many dendrites each, the multiplicity of possible connection from cell to cell is very important.¹² These "synapsis" seem to be the meeting point where the psychical forces of Mind meet the physical forces of the human being's nerves, and it seems to indicate that the mind is the master of the brain to produce the various conscious states in man. These conscious states, however, are not concerned in sub "surgical" unconsciousness in which the Ego is set free



1.—Normal ganglion cell. From anterior horn of human spinal cord, showing the nucleus in its normal central position with its nucleolus. In the body of the cell are seen the chromophilic bodies. Three main protoplasmic trunks or dendrites pass off from

altogether, leaving the body devoid of sensibility to pain or to other sensations.

(To be continued.)

the upper portion of the cell. The largest process branches at a short distance from the cell. To the left is seen the axone or axis-cylinder process free from chromatic substance, as is also that portion of the cell from which it takes origin (axone hill).

2.—Ganglion cell from the anterior horn of the human spinal cord of a case of alcoholic neuritis. Showing eccentricity of the nucleus and a large central area of the cell body free from chromatic substance (central chromatolysis), with an arrangement of the remaining chromophilic bodies around the periphery. (The similarity between the appearance of this cell and the one shown in Fig. 6 should be noted).

3.—Ganglion cell from the anterior horn of the spinal cord of a rabbit inoculated with rabic virus and killed shortly after the onset of symptoms. Shows an early stage of chromatolysis; the chromophilic bodies being pale, ragged, and vacuolated.

4.—Ganglion cell from the anterior horn of the spinal cord of rabbit which died on the ninth day after inoculation with rabic virus. Shows extreme chromatolysis, only a few fine granules of chromatic substance remaining at the periphery. The cell is swollen, the nucleus has disappeared, and the cell body and processes are stained more deeply with the erythrosin than is the case in normal cells.

5.—Normal ganglion cell from a human spinal ganglion of the posterior root. Showing central position of the nucleus and the concentric arrangement of the chromophilic bodies.

6.—Ganglion cell from the posterior root ganglion of a rabbit three weeks after section of the sciatic nerve. The cell shows extreme eccentricity of the nucleus with central chromatolysis and a peripheral arrangement of the remaining chromophilic bodies—axonal degeneration. (There also remains in the central portion of the cell some chromatic substance in the shape of fine granules forming an irregular reticulum. The similarity between this picture and the one shown in Fig. 2 is apparent).

7.—Portion of a posterior root ganglion from a case of tabes dorsalis. Showing degeneration in the ganglion cells with increase in the interstitial connective tissue.

8.—Two pyramidal cells from the normal human cerebral cortex. While the pyramidal cells in the human cortex vary considerably in the amount of chromatic substance which they contain, these are of an average type.

9.—Two pyramidal cells of the human cerebral cortex from a case of eclampsia. These cells show marked chromatolysis.

Showing main or apical dendrite passing upward and numerous smaller dendrites coming off from the main dendrite and from the body of the ce. All single axone (axis-cylinder process) passes downward from the base of the cell, giving off two collaterals.

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ITINERARY OF THE "CLEVELAND SPECIAL" TO THE NATIONAL DENTAL ASSOCIATION MEETING AND RETURN

LOS ANGELES, CALIFORNIA

BY I. L. FURNAS, D. D. S.

DENTAL DEPT., WESTERN RESERVE UNIVERSITY, CLEVELAND, OHIO

If you have ever been "West" then the appeal for your attendance at the next meeting of the National Dental Association to be held in Los Angeles, California, July 17th to 21st next, will not fall on deaf ears.

If you have never had an opportunity to "See America First" and inspect at close range both sides of the Rocky Mountains as well as the great deserts and mesas of the great "West," is it not true that you have, secretly perhaps, solemnly promised yourself the treat of this great trip some time?

To begin with, please let it be understood that no one trip will cover the entire "West." It is too vast for that, so your trip should be planned so as to cover the four principal features that interest the visiting tourist most, namely: *one*, the great South-Western Indian section, through New Mexico and Arizona; *two*, the Grand Canyon of the Colorado; *three*, the great fruit-belt of the Pacific slope from San Diego, California, to Vancouver, British Columbia; and, *four*, the scenic wonders of the great Canadian Rockies.

You should plan for the various stopovers, allowing not too much, but just enough, time to see the various points of interest. Just a word of warning might here be well said to prevent you from being induced to spend considerable time visiting some grossly over-advertised scenic wonder when other points of more importance are at hand. You will have ample opportunity to do this very thing many times.

Here is the trip planned. It is the opportunity of a lifetime. On or about June 29th or 30th, there will leave Chicago, over the historic Santa Fe route, a special train for dentists and their families. While this train is arranged specially for the dentists of Cleveland and the state of Ohio, every member of the National Dental Association, his family and friends, are welcome, no matter where they may live. On the morning of the second day, it will arrive at Colorado Springs, Colorado. Here the party will rest for the day and take side trips to the top of Pike's Peak (14332 ft.), the North Cheyenne Canyon, the Garden of the Gods, Mt. Manitou, and other places of interest.

Leaving Colorado Springs that night, a short ride of three hours brings us to Denver. The train lies here all the following day while we take the Lariat Trail Drive up Lookout Mountain or many of the beautiful park drives.

Leaving Denver at about ten P. M., the next stop will be the following afternoon at Lamy, New Mexico. Here our train leaves the main line of the Santa Fe for a short fifteen-mile trip to the town of Santa Fe, the second oldest white settlement in the United States, having been founded in 1605

The day has been an exceedingly interesting one. From the car window we have seen the marble markers of the old Santa Fe trail, Los Vegas, Chapelle, Starvation Peak, the Pecos ruins, Apache Canyon, Glorieta Pass, Ratoon Pass, (altitude 7533 ft.) the abode pueblos of the Indian, and it is a fitting ending to a perfect day to spend the evening in the wonderful old city of Santa Fe.

That night our train takes us to Albuquerque, New Mexico, where we spend the following day in a most interesting way with a visit to Isleta, an Indian pueblo, whose records go back for twenty-three generations before Columbus discovered America.

Here an Indian Ceremonial Dance has been arranged, which alone will be worth making the trip west to see.

Leaving Albuquerque late that night, we awake the following morning in one of the strangest and most interesting parts of the American continent, and we realize that we are in the heart of the Great Southwest.

A short stop will possibly be made at Canyon Diablo and Adamana and into the petrified forests and the painted desert—places too wonderful to attempt description.

About one P. M. our train again leaves the main line at Williams, Arizona, and we travel sixty miles northward, and at four o'clock in the afternoon, we arrive at the greatest, most massive, and magnificent wonder of the entire world, the Grand Canyon of the Colorado river. The English language utterly fails us when we attempt to describe this great geologic gash in the earth's surface, 218 miles long, 12 miles wide and one and one-half miles deep. Its glories are beyond the wildest imagination, and here the wildest myth need not feel ill at ease.

Here we have the opportunity to see the sun set on this great scene, sunrise on the following morning, all day for a trip along the rim or into the canyon, and a second sunset, leaving about ten P. M.

That night and the following morning, we wind in and out, up and down through the mountains of Arizona, with the scenery ever changing and new.

Every trip to California by whatever route you choose, you must cross the desert. This vast expanse of arid waste is extremely interesting and a part of the trip that, from an educational standpoint, you could not choose to miss. Our trip to this point has been for the most part at an altitude of an average of 5000 feet with a temperature at this time of the year ranging from 65° to 75° F. Now we are to take a drop to about sea level, and the chances are good that for the next three and one-half hours, the thermometer will play along any place from 90° to 120° F. You may be able to console yourself a little, however, when you think that you have taken the shortest desert trip, and it is an experience well worth the heat.

We are climbing the mountains again, and we know that we are in California by the cool balmy air and the green on the mountain side.

Our train arrives at Los Angeles about four P. M., and here we find ourselves in another city of wonders. Los Angeles has a population of over

600,000. It is the largest city on the Pacific coast, and is filled and surrounded with innumerable points of interest.

It is yet the week before the National Dental Association meeting, and plenty of time remains for trips to San Diego, Tia Juana, orange groves, walnut ranches, lemon ranches, the beaches, Catalina Island, the submarine gardens, the mountains, the missions, or perhaps to attend the meeting of the American Society of Prosthetists and Exodontists, both in session at this time.

The National Dental Association meeting need not be mentioned more than to say that it is a sure thing that it will be one of the best meetings ever held. The western idea is to "do big things right." My prediction is that they will give the easterners a mark to shoot at for some time to come on the quality of their meeting.

Please remember that up to the time of our arrival in Los Angeles the *train has been our hotel*. At no time or stop have we been forced to pay a hotel bill, and this is no small item of saving. Our meals have been served at the Harvey Houses along the road, and I defy any one to show me a place in the east where the food is better, cleaner, and cheaper.

We have now been in Los Angeles two weeks. You may stay two months if you like for your ticket is good until October 31st.

Leaving Los Angeles via the Southern Pacific, we go north either over the shore line or the valley route. At Santa Cruz we may stop off and see the world-famous California Big Trees, and at Merced it is only a short trip into the famous Yosemite Valley.

Our next stop is San Francisco where we may stay as long as we like for we are traveling individually now, and not as a party, unless we choose to form our own party.

Mt. Tamalpais, the Golden Gate, the Rim of the World drive, and other points of interest are to be seen.

Leaving San Francisco at ten-thirty P. M. on the Southern Pacific "Shasta Limited," we find ourselves on the following morning again in the heart of the mountains and the beautiful valleys filled with wonderful cherry, apple, and prune orchards.

Soon we notice one great mountain standing out high above all others and for the greater part of the day Mount Shasta (14,444 ft.) is at our side.

The following morning at about eight A. M. we arrive at Portland, Oregon. No visitor should ever leave Portland without taking the Columbia Highway Drive. It is second only to the Grand Canyon in scenic beauty.

Mt. Hood stands like a giant dish of pink ice cream, and may tempt you to do a little bit of mountain climbing.

It is a short trip from Portland to Seattle, Washington, and here again a day can be well spent.

Leaving Seattle about eight A. M., we now take one of the most scenic and delightful boat trips in all the world, going to Vancouver, British

Columbia, via Victoria. The trip takes all day, but you will be so absorbed with nature's wonders that you will declare it the shortest day of your life.

Vancouver will interest you immensely as long as you care to stay, particularly if you are not a strong disciple of Mr. Volstead. The parks and mountain drives are wonderful, and the city itself is more than interesting.

Leaving Vancouver at seven-thirty P. M. on the Canadian Pacific, you prepare yourself for one of the most wonderful mountain trips in all the world. Anything in the United States is tame and insipid compared to it. You will begrudge every minute of darkness when you think of what it forces you to miss. No trip can surpass this magnificent ride through the heart of the Canadian Rockies. There are many vantage points along the way at which you may stop if you choose, Sicamous, Revelstoke, Glacier Field, Lake Louise, Banff, and many others, and no time spent at any one or all of these places can be counted as lost.

Soon after leaving Banff, we enter the great plains and farming country around Calgary and extending eastward to Winnipeg. Here we travel through miles and miles of farm lands where it would be impossible to find a natural hill one foot high. Winnipeg is the gateway into the great Canadian northland, and no citizen of the States can fail to find many interesting things here.

Leaving Winnipeg, we soon enter again the land of the Stars and Stripes at Emmerson, and the following morning finds us in the twin cities, St. Paul and Minneapolis. Many points of interest are here found for the visitor if he still has a taste for sight-seeing.

Leaving St. Paul at nine-thirty P. M., the following morning brings us back to our starting point, Chicago, and from there home where we will many times repeat our trip for the entertainment of our friends and the satisfaction to ourselves.

The expense of this trip is figured on a special rate for this occasion, and is, at this early date, subject to some change, but it is thought by the railroad companies to be within a very small amount of correct. The following rates include both railroad fare and Pullman berth for the round trip.

One in lower berth.....	\$161.12
Two in lower berth (\$138.62 each).....	277.24
Two in compartment (\$174.99 each).....	349.99
Two in drawing room (\$191.12 each).....	382.24
Three in drawing room (\$160.74 each).....	482.24

(Extended stopovers will slightly increase this Pullman rate.)

Parties who do not care to take the Canadian Rockies trip can get the following rates good going and returning over any route in the United States.

All rates shown are for the round trip.

Fare round trip from Chicago.....	\$ 88.86
Pullman, lower berth.....	45.50
Total.....	\$134.36

Grand Canyon side trip.....	9.12
Total.....	\$143.48
Two in lower berth (\$121.74 each).....	\$243.24
Two in compartment (\$162.62 each).....	325.24
Two in drawing room (\$174.12 each).....	348.24
Three in drawing room (\$149.46 each).....	448.24

The diagrams for car reservations are now open for this trip, and car space will be allotted in the order in which applications are received. If you are anxious to secure lower berth accommodations, it is advisable that you take care of this matter at an early date.

Further information regarding this trip can be secured by writing Dr. I. L. Furnas, Western Reserve University, Cleveland, Ohio.

Put Your Best Effort Into
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Rotary Club Members

PENETOLOGY

Conducted by WILLIAM A. LURIE, M. D.,
1130 MAISON BLANCHE BUILDING
NEW ORLEANS, LA.

This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

To many it may seem inconsequential and a waste of time to undertake a discussion on terminology, when one has so broad and growing a subject to treat, while diagnosis or interpretation, the real pith of the nut, awaits explanation.

As said in the beginning of this series, mistakes have been made, (perhaps this conception is fallacious also) but it is hoped that this train of thought may lead to a broader and greater conception of the subject. Therefore as the foundation must be a sturdy one, it must rest on the broad ground of an intelligent, common and simple understanding.

Some explanation to undertake!

There are many who will criticise, contending that there is no need of new names, nor need to cast off the old. A short-sighted, narrow view; but, unfortunately, there are some who still prefer to continue in a beaten path, even though it lead nowhere, and is not even a good path upon which to stand still. A new idea is looked upon with the utmost suspicion by them. They will take this idea and handle it their usual way.

But to continue, trying not to be too technical.

The tissues of the body are of two main divisions. First, the soft tissue which comprises the covering membranes of the body, the muscles, the blood vessels, tendons, fat, etc; and second, the bones of the skeleton, which include the teeth. In considering dental Penetology and in the study of the dental penetogram, there is an added foreign substance the picturing of which must be understood. That is the materials used in repair of the teeth and in bridges and root canal fillings.

The difference in appearance of soft tissue and a bone tissue is well known to almost everyone. The soft tissue appears as the darker portions of the films, while bone tissue is represented variously on the penetogram, dependent upon its density. The density of bone is dependent upon two things principally. First, the compactness of its structure, and second, its content of mineral salts. To a great extent the latter is governed by the former, but in dental areas there are bone portions to be seen which have an extremely high mineral content (tooth enamel) as compared to compact bone in other areas.

Roughly speaking, the two grades of tissue of the body (muscular and bone) are distinctive in their penetographic appearance chiefly because of their mineral content. The mineral content governs the density and likewise governs the penetrability of the area.

From the tables shown in the February issue it is possible to note the comparative density and the resistance to penetration which various gases, minerals and metals possess. The more resistant the substance of a structure is, the less will be the penetration of light rays through that substance. Applying this axiom to the subject of dental penetology, where the region pictured is composed of an area within which masses have a variety of densities, there is found a wide range of penetration to the rays from an X-ray tube. The distinct differences are as mentioned, soft tissue and bone structure. The difference in the penetration of these two structures is the difference in the density of their component parts. In reality, the difference is in the resistance of tissue having mineral salts, chief of which is calcium, and the resistance of tissue without the mineral salt content.

Can this difference of penetration and the division of tissue into grades help in the ultimate diagnosis of a case or in the interpretation of a penetogram? It most certainly can. It simplifies the entire subject, but only when understood in conjunction with our knowledge of the anatomy of the parts. This means the knowledge of the tissue that exists in a given area normally, and what significance any alteration of the appearance of that tissue or the development of tissue in an abnormal position, may have in a given case.

Through the study of anatomy one learns where various kinds of tissue exist normally. Pathology teaches the changes that take place in various tissues due to disease and the results of such a process. These are important factors to understand. When correlated with our knowledge of resistance which substances or tissues should have under normal conditions, and a knowledge of what may take place pathologically, the difference in appearance presented by a pathological process becomes a matter of almost mathematical precision, when studied by the definite rule of penetration.

First one must understand a classification of tissue shadow; and, because of the definite division to which the substances present in dental penetography lend themselves, the author has divided these shadows into three grades. These grades are definite and individual, and to each may be given a coefficient of resistance which is governed by the mean density of that tissue. In short, the three grades of tissue in dental penetology are as follows: Grade 1—soft tissue of the class of cheeks and gums, as well as pulp substances appearing normally within a tooth. Grade 2—bone structure. This grade of shadow, because of the presence of two distinct types of bone in the dental areas (alveolar representing the porous or less dense, and tooth structure representing the extremely dense) can be subdivided under two headings: (a) alveolar tissue, and

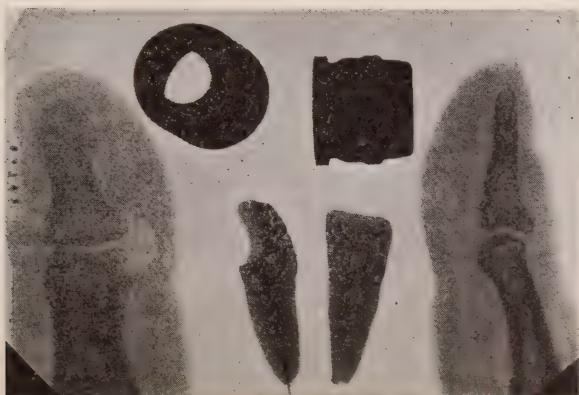
(b) dense bone or tooth structure. A third class of shadow can be distinctly noted in dental penetrography, restorations composed of all foreign materials such as are used in and about teeth, bridges, etc., and in root canals. These form shadows of Grade 3. As stated before, each of these tissues and substances and shadows has a definite coefficient of resistance.

Grade 1 shadow, representing soft tissue, does not contain any of the salts of the mineral group, and therefore does not develop a resistance greater than any mineral salt. The mineral salts in the body have a density of approximately from 1.55 of calcium to 4.95 of iodine. Grade 1 shadow may therefore arbitrarily be taken to have a resistance coefficient to the peneto-ray of less than 1.55, or approximately 1.

Grade 2 shadow is divided into (a) alveolar bone and (b) dense or compact bone. In this grade of shadow we have a difference in resistance due to the resistance of compactness of mass as well as density. Alveolar bone mass represents a displacement mass as great or even greater than that of compact bone; yet the total resistance to the peneto-ray of that mass is less than the resistance registered by a smaller mass of dense bone. The outstanding characteristics of Grade 2a shadow over Grade 2b shadow is that in the former the structure of bone, the Haversian canal system, is distinctly pictured. In Grade 2b shadow the compactness of the mass pictured does not permit of sufficient penetration in the time for picturing to detail the finer structure, except the larger canals, within the tooth, as the pulp-chamber and root-canals, which contain soft tissue of Grade 1. The coefficient for Grade 2 shadow is from 1.55 to 4.5.

The picturing of Grade 1 shadow within Grade 2b is one of the strongest arguments against a penetogram being a shadow picture, and for its being a registration of the penetration of light. Tissue of the type of Grade 1 is visible within tissue of greater resistance, as in Grade 2.

Grade 3 shadow is that of foreign substances introduced into the tissues for their treatment or the replacement of parts. These substances are most often of the metallic group with a high coefficient of density. The



Positive Print

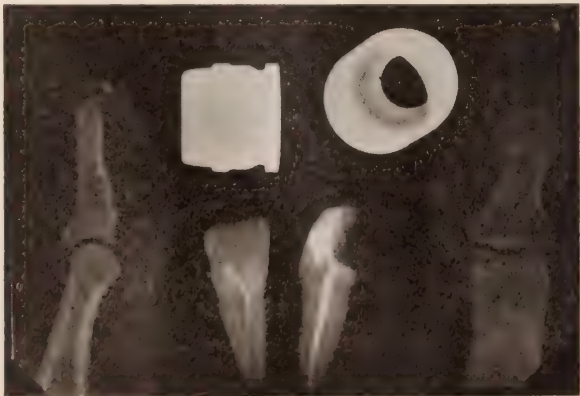
density of the metals is well over 7. In contradistinction to Grade 3 shadow over Grade 2, which might approach in density that of some metals, the penetographic appearance of Grade 3 shadow is smooth and without structural appearance, while Grade 2 shadow either depicts structural appearance or is of characteristic shape.

The following chart is devised as a handy reference of penetological shadow grades, and their coefficient.

Penetographic Shadows.	Grade 1 shadow coefficient of density less than 1.5	{ Tissue of density of less than 1.5 a. Tissue of density greater than 1.5 and less than 2.5 (Alveolar bone particularly)
	Grade 2 shadow coefficient of density greater than 1.5 and less than 5	{ b. Tissue of density greater than 2.5 and less than 5 (Dense bone and teeth par- ticularly)
	Grade 3 shadow coefficient of density greater than 5	{ Foreign masses and sub- stances of density greater than 5 (Most often mineral salts or metals)

The two accompanying illustrations reproduced from the October number of THE SUMMARY (page 853) are explanatory of the several grades of shadow. The first is a positive print from a penetogram, while the second is a negative. Note particularly the reversal of the positions of black and white and of the tones of grey in these pictures.

In the first print the effect is the same as any finished photographic picture, whereas the second is more like the impression one gets from the



Negative Print

study of the penetographic film itself. These two prints are shown to avoid such confusion as might arise because of difference of the appearance of pictures by reflected and by direct light. It is only when we view a *Negative* picture in a shadow-box, or by direct light from a lamp or sunlight, that we are seeing detail in its direct proportion. When we see these same pictures reprinted, either here or by any secondarily reproduced process, we view a *Positive*. All our visual impressions are by reflected light except when observing a luminous body, as the sun, moon, stars or other light-radiating or transparent bodies. However, when we study a penetrogram, we study a negative in the photographic sense, and we study it by direct light. Prints of all kinds are visible because of the light rays which they absorb and those which they reflect.

A penetrogram is the result of a certain amount of light penetration. It is a permanent record of the resistance to such penetration that any pictured area possesses.

To study a penetrogram, we do not do so by reflected light or the light which a penetrogram reflects, but we read it by light of which it resists the penetration of. Because of a greater penetration of light on one portion of a film than on another, that portion where greater action has taken place will be heavier and darker, causing it in turn to resist the penetration of light because of its heavy coating. Photographic films are composed of salts of silver which oxidize by the action of light. The variations in the difference of penetration and oxidization on any film are brought out by the development of the film in the various chemical solutions for that purpose. The finished picture usually studied in penetology is the negative.

We will, therefore, study the grades of shadow from negative or the second print previously shown.

The general black area indicates where nothing obstructed the peneto-rays (X-ray), a register of a minimum of resistance and maximum of penetration. Attention is next directed to the two index fingers represented to the right and the left of the pictures. The phlanges in these fingers are more distinct than the outlines of the fingers themselves. The outlines of the fingers are distinctly visible, however. There is no doubt that the bones of the fingers are surrounded by soft tissue, in the sense which it is being used here; that is tissue with a minimum of mineral salt content. The difference of the resistance of soft tissue over the resistance of areas in which nothing is resisting penetration is here pictured. It is recorded and noted as a dark grey color rather than the heavy black. In viewing these areas in a film by direct light it can be noted that some light is permitted to penetrate them, still no great amount, but definitely more than where no resistance to light penetration is encountered. This difference is defined as Grade 1 shadow.

The bones of the fingers and the two teeth pictured are clearly defined. They appear as a lighter color or rather a lighter grey in their composition than can be noted in either the complete black or the grey of shadow of Grade 1. This is Grade 2 shadow. To the right, particularly, can be noted

bone structure much as it appears in the alveolar process. This shadow is termed Grade 2a. This is in distinction to the palmar and dorsal margins of bone pictured to the left. Particularly in the lower phalanx at the left can the loss of bone structure within the shadow be noted. It will be now noted that the teeth, pictured in the lower center, record a resistance about equal to that just described about the lower portions of the finger pictured to the left. This type of shadow is known as Grade 2b. Except for the root canals and pulp chambers, which are normally filled with soft tissues the penetographic picture of a tooth shows no structure, such as can be noted in bone shadow of Grade 2a. The type of Grade 2b shadow shows clearly that through the area which it represents there was a greater resistance and, therefore, less penetration and less light action on the film, to produce this shadow. The composition of this tissue is similar to that which produces shadow of Grade 2a, yet the resistance is decidedly greater. The cause for this difference is to be found in the difference of the greater density of the tooth mass over the density of a like mass of bone of alveolar type.

Grade 3 shadow, or the shadow picturing metals and foreign substances is clearly pictured in the upper center portions of the pictures where a metal cap and curtain-rod end are reproduced penetographically. In the lower picture the cap is shown to the right. It is a thin metal piece, and it is interesting to note that where the metal has been penetrated in its thinnest proportion, it registers a lesser resistance than through that portion where the mass was thicker. Note the grey appearance inside the general area of the shadow.

Now, to call attention to Grade 3 shadow within the teeth. In the two teeth pictured, there will be noted an alteration or rather interruption of the smooth shadow, usually seen as Grade 2b. This interruption or replacement is noted as resulting from the introduction of shadow of Grade 3. Within the root canal of each of these teeth there can be seen some root canal filling material. In the tooth to the right of the picture, there can be seen some mineral filling material, (gold), still in position in the crown. The difference between these grades of shadow is distinct and well defined. In the original penetographic film, this distinction is even clearer, because of the loss of detail which takes place in the making of the electrotpe for printing and reproducing these pictures.

The study of dental penetology does not confine itself to a study of the teeth, their positions, numbers and condition of their fillings and the perfectness or imperfectness with which a root canal has been filled, but it encompasses the whole field of dentistry, and pictures in a graphic manner the relation of dentistry to medicine. This is a broad assertion to make, and a heavy responsibility to cast upon a subject; but the more one studies shadows and shadow-values, the more certainty one feels of the condition that is being pictured and what changes are taking place locally. This is in reality the keynote and foundation to a comprehensive understanding of what is pictured, why it is pictured, and the effect any changes which

may take place may have on a patient. In reality, it is the reason for the existence of the subject of Penetology and the reason for its vastness.

The relation Dental Penetographic interpretation has to a correct understanding of a condition, and the relation the conditions found bear to health in general, embraces the entire subject of medicine and dentistry.

PENETRATION PARAGRAPHS

Can the penetogram be relied on as a positive indication of conditions?

This question is often asked and most often answered in the negative. It should be answered in the positive. It would be more aptly put to say, "Can we positively read all the conditions," or, "Do we understand the conditions as pictured in the penetogram?" To such a question the answer is distinctly negative. The forces which are operative in the making of a penetogram are absolute. The energies developed and consumed in the various parts of the process of picture-taking and their making are no more easily destroyed than the energy developed from any source whatever. The two factors which control the *reading* of pictures are the application of the force to make them and the ability of one to describe what such force pictures. Yes. The picturing is that part of penetology which can absolutely be relied on, and with the present day fool-proof machines and improved technic of picture-taking and better films (made to suit all needs) for picture making, it can be truly said that the penetogram is an absolute and positive record of the condition of any given area. Pictures are mute evidence of light ray penetration. Are you capable of interpreting the evidence?

Considering a penetogram as mute evidence of a condition, can a diagnosis from it be relied on?

In this question, the elements of human knowledge, human ability and effort enter most forcibly. We do not all see alike. Neither do we all do our reading of pictures alike. Even though we all did the latter in a like manner, we should still not all "see alike." By "seeing alike," we do not mean in this instance in the same manner. The eye is the organ of sight, and even though our sight be perfect, our vision is not the same. There are some who can see more and some who see less—as the one sees more and the other less they judge what they see. To the former, the penetogram as a record presents more than it does to the latter. To the former the penetogram presents more for interpretation than it does to the latter. To him it is a better and more certain form of diagnosis than it is to one with less ability to see.

■ The ability to "see" what a penetogram records is first dependent on ability to understand and translate a flat picture; that is, a picture in which the several objects are not portrayed or made in relief. The picture is one of black-and-white, and the various shades made visible by a variation in the mixture of black and white. (White is made mention of because it is the "color" most often used in reading-boxes, and is the color which ema-

nates from the ground glass cover.) To understand and to translate such a picture means the ability to convert the shades of black and white into the forms of bones, or teeth, or areas of soft tissue which they each represent. As ability to do these things grows, the ability to determine position of each and their position in relation to one another is developed. Subsequently the ability to determine the distinctness of certain lines from one another is developed, and then the ability to recognize foreground and background becomes a matter of more easy visibility.

In connection with seeing and ability to see is visual-ability. Visual-ability depends on the ability of the mind to perceive. This is not always equal, as was indicated about sight and seeing. To a degree, the interpreter of a penetrogram must be a visualist at least to the extent described above. He must visualize a flat black-and-white picture into the representation of teeth and jawbone. He must be capable of translating the appearance of the tissue of the mouth from within outwardly, and to place each object within the field as in the foreground—the lingual or palatine position—or in the background—the buccal or labial position. It requires much practice and an accurate sense of proportion to do these things, and every one is not gifted with this ability. Therein lies the explanation of the reason for the disparaging reports which we note about what the penetrogram will not show. The penetrogram does show it—yes, as mute evidence; but do we all see all we could and what it would we should see, if we could?

The reading of a penetrogram is not necessarily the work of a visionary. It is distinctly not; however, there is a certain amount of ability to observe the inanimate and to perceive the animate which is necessary. This means that the reader must be able to view a drawing of a cube or a sphere and to picture in his mind's eye that he is seeing one or the other of these objects. This power is not delegated to every one. There are many who can see the plans of the architect and in their mind's eye visualize the building, the size and shapes of various rooms and even picture the furnishing of such rooms. There are decidedly more to whom the ground plans or even pictures of similarly constructed buildings mean no more than the actual lines they can see, and represent no definite foreground, background or length. To this class of readers the penetrogram can never be more than a rather indefinite array of lines and representation of position of parts, and to them it can never be an absolute record. They do not have the power of correlating the force of penetration registered with the resistance encountered. They cannot view in their mind's eye the internal arrangement of parts within bone any more than a person—whose ability is lacking—views the plans of the architect and pictures to himself the house which will be built for him. The architect's plans may have mistakes and may vary with the completed house, but the penetrogram delineates the plans of internal areas it pictures. There is no alteration which is possible in such force registration. The picturing is absolute. Can we rely on our own ability to read what we see? Do we see all that we should? This knowledge is vitally necessary before any attempt to diagnose should be attempted.

Penetology is not without its dangers. The danger is two-fold, and is a potent one in either direction. The danger is to the operator and to the patient. The end results are usually equally fatal. To the operator or the careless user of even a well-protected dental unit, there still exists the danger from the long-continued exposures to the rays. Much of this danger, however, has been overcome. There are vastly fewer X-ray burns in the present day than in the early day of the X-ray, and there are a great many more machine operators and much more work of this nature being done. The ratio of such cases is decreasing. This is not given as a reason for the letting up on *Carefulness*. The danger of X-ray burns to the operator is still present, and he who is unfortunate enough to be its victim may survive, a miserable cripple, or die an early and horrible death. This is not idle gossip. The old adage that "familiarity breeds contempt" may be well applied in this instance. Everybody, (in this instance "everybody" means the dentists), is doing it. The feeling that "what one person can do the other can do," prevails. A commendable spirit—a progressive spirit—a dangerous business, however. The cases of dermatitis of unexplained origin which are being reported as developing among the dental profession may find an explanation in an irritation which results from the exposure to the peneto-rays of skin soaked in a hypophosphite solution. Such a solution is an irritant to many skins under conditions less conducive of chemical catalytic action. Careful cleanliness, particularly chemical cleanliness, is rather lightly considered by the present-day operator of a dental X-ray unit.

A new danger—less thought of—is always present when the machine is in operation. The machine during operation develops from 40,000 volts upwards. Therein lies a second danger. This danger is the greatest to the patient rather than to the operator. However, it is a possible danger, and must not be overlooked. With the concealed and protected control apparatus and the improved apparatus of the present day, the operator is well protected. Much less attention has been given to the patient—the victim. Regrettably, there have been several deaths recorded which have resulted from electric shock during the time of the taking of a penetogram. An accident of this nature is a calamity. Sooner or later, the manufacturers will have to follow the example of one of their number who makes a guard to prevent the patient accidentally raising a hand or otherwise coming into contact or near any of the high tension wires, or those carrying a high voltage current. The danger is even greater than one might imagine at first thought.

Recently a newly-installed machine was being operated near a wall on which a picture was hung by a wire cord. Behind the moulding from which the picture hung were the telephone wires from the switchboard to the desk set in an adjacent room. The phone was in use. By chance, the current from the machine jumped to the picture cord-wire and burned out the telephone, badly shocking the user. At the time of the accident, it was thought that the burning of the picture-cord was the only damage done.

It was carried quite a distance, and except for the inability of the picture-wire to carry the full current, there may have been an electrocution recorded. Electrocutions during dental X-ray photographic exposures have been recorded. There will be others until such time as the dental profession realize the dangers of dental X-ray picture-taking, and the manufacturers realize the protection that a patient requires. Electrocution is an easy death they tell us, but what man of science, trying to do his duty to safeguard a person's health—what one of us wants to be an executioner?

"Every dentist should have a dental X-ray unit," is the slogan of the manufacturers of this most vital link in the chain of evidence a dentist should have to pass sentence on a tooth. Yes, *to pass sentence on a tooth*—to condemn it—or to grant its continued existence through proper treatment. A sad commentary that some patients must die in order that the knowledge may be had of whether or no a tooth should be saved. This is not a criticism of the number of machines being made and sold, but a continuation of the thought of the dangers which are lurking in the taking of pictures carelessly or without thought of the dangers attendant on the operation. Aside from the current developed and used for the sole purpose of taking pictures, improper grounding etc. may cause a variety of surges in the high tension circuit, which are difficult to manage and will at times jump a great space gap. The rapid installation of a dental unit in a crowded dental office adds to this danger. A metal base dental chair with cuspidor attached offers a wonderful opportunity for a burn or shock from this source. A rubber mat under the chair might offer some protection. A wooden chair, not connected with the water supply however is much safer. Now the last of this note of warning—and it concerns the metal based chair as the position for dental penetology. The unit may at times become "grounded" and to the water system and through it travel to the chair and the patient, who will then suffer electric burns or electrocution, depending upon the potential of the current generated. In a general way the dental unit type machine is the more dangerous in such an accident than a machine in which a rectified current is used. In the former type of machine the secondary coil is grounded at one end, while in the latter it is grounded in the middle, thus in the event of an accident as described, in the first instance the patient gets the full dose of the current while in the second, only a portion of it.

Pictures should not be taken in a general dental operating room. Under the present conditions, the danger is too great. There should be a special room—especially equipped for the comfort and safety of both the operator and the patient. When the dental profession, each individual one, can afford to equip a proper room for the picturing of the dental areas, then yes—"A dental unit for every dentist," but until then—why not the specialist in "*Penetology*" and every dentist competent to read good pictures?

LEGAL DEPARTMENT

CONDUCTED BY ELTON J. BUCKLEY, 643 LAND TITLE BUILDING, PHILADELPHIA, PA.

Every Man With a Bank Account Should Read this:

I have just read the decision in a case which affects every business man who keeps a bank account and who, as most of us must necessarily be, is dependent upon the honesty of employees for the protection of his bank account against forged checks.

In this case the depositor had a bank balance of \$7,290. An employee who had access to his checks began to forge checks against the account in March. Each month after that until September he drew a big check, and in September he drew three. The last was the straw that broke the camel's back, it overdrew the account, and the depositor was called up and told. When he investigated he discovered the forgeries, and at once made demand upon the bank for all the money it had paid out on forged checks. The bank refused to pay on the ground that McCarty, the depositor, had been negligent in not keeping the proper track of his cancelled checks. McCarty sued, and the court decided in his favor, laying down some new law which it is well for both bank and business men to know.

Now it is well established that when a bank pays a forged check against some depositor's account, it must refund the money to the depositor unless (1) the depositor has been negligent in some way which helped the forgery, or unless (2) the depositor has been careless in going over his monthly balance and cancelled checks, and so allowed the thing to go on longer (as where there are a number of forged checks extending over a period of time) than it would have been had the depositor kept a close watch on his checks and statements. The bank in the case I am discussing, attempted to escape under the second reason, and the facts on which it relied were these:—

The bank with which McCarty dealt had a more or less careless method of balancing its depositors' books. So have many banks. Books weren't balanced at any certain time or at the end of any certain period. And after they were balanced they were not immediately delivered to the depositor. They just stayed in the bank until the depositor came after them, and in the case of accounts that weren't very active, this meant several weeks or months.

In McCarty's case his book was balanced and returned to him in February, before the forgeries began. He kept it until July 3d, when he sent it in to be balanced again. It was balanced then and that balance unquestionably showed the forgery. The book, however, remained in the bank ready for him until September, when he came for it, but even then he didn't look at it until September 24th, when told his account was overdrawn. The account in this case seems to have been inactive, otherwise the book would not have stayed in the bank so long.

The bank defended on the ground that it was McCarty's duty to have his book balanced

frequently, and to get it after it was balanced but even if he didn't get it, that after the bank had balanced it and put it aside waiting for him, he was charged with whatever it would have shown him had he got it and looked at it.

The court decided against the bank on all these contentions, and declared in substance that a depositor is not obliged to have his book balanced at any particular time, nor after it is balanced is he obliged to go after it. If the bank wants to relieve itself of responsibility in case of forged checks, it must see that the book is balanced frequently, and that the balance book and checks are placed in the depositor's hands. After that, if he doesn't look at them, the bank is not liable for forgeries which could have been prevented had the depositor made the proper inspection.

This is from the decision:—

The correct principle by which the respective liabilities of the bank and depositor are determined are these: The bank is bound to know the signature of its depositors and the payment of a forged check, however skillfully executed, cannot be debited against the depositor. From the relations the depositor and the bank bear toward each other, there is a duty also upon the depositor to examine his accounts and vouchers, and to make known to the bank any improper vouchers and charges returned, and where injury results to the bank from the failure of the depositor to do his duty in this respect, the law holds the depositor liable for such injury, the result of the depositor's omission. This statement of the law is unquestionably based on sound reason and is supported by practically all the authorities.

It is the contention of the defendant bank that when a depositor has called for a statement of his account, by leaving his passbook with the bank and it is balanced by the bank and is ready for delivery to the depositor, along with the cancelled checks charged by the bank against his account, it then becomes the duty of the depositor to call for the book and the checks within a reasonable time, failing in which he is in the same position as to imputed knowledge of forgeries and as to negligence with respect to their disclosure to the bank, as he would be in if he had actually received the book and the checks from the bank.

In the absence of an agreement between the bank and the depositor, express or implied, he is not bound to ask for a statement of his account at any time, but may rely upon the bank's observance of all its obligations in the premises. There was no such agreement here and the question is whether merely leaving his passbook to be balanced by the bank imposed on plaintiff the duty of calling for the book and the cancelled checks within a reasonable time, or indeed at any time, under the penalty of relieving the bank from liability for the repetition of errors already committed.

(Copyright, February, 1922, by Elton J. Buckley,

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultze Building, Columbus, Ohio.)

Marking Palatal Denture Limits

Make the base plate shorter palatally than the finished plate is to be; place in the mouth and instruct the patient to "open wide and partially close," at the same time gently touching with the finger the region slightly back of the junction of the hard and soft palate to ascertain how much real displacing pressure is exerted by the moving tissue just back of the hard palate. Previously prepared strips of base-plate wax one-eighth to one-fourth inch wide by one inch long are now singly introduced into the mouth in contact with the lingual surface of the base plate, one end extending beyond to the limit of the finished denture. With hot spatula attach the strips to base plate—three or four strips are sufficient. The base plate with strips attached is now transferred to the cast which is grained where the wax extensions indicate will be the proper palatal denture limit. The same method may also be applied to ascertain the buccal and labial denture limits.—*Joseph Horner, Cosmos.*

Practical Hints for Oxygen Gas Extractions

Do not use gas on very stout patients or you will have trouble. Use a local instead.

It is usually safe to use it on anyone who is well enough to walk to the office if properly administered.

It is essential that the patient have confidence in the operator; tell the patient to concentrate on a pleasant thought; do not give any instructions about breathing unless the patient starts to breathe too fast; if instructed beforehand he will surely drain the bag. If the gas tank goes dry when half under, the case will usually be a failure.

One of the chief reasons for failure to get the tooth and loss of confidence on the part of the patient is caused by the patient slipping down in the chair while under the gas. To prevent this occurrence all one has to do is to close in the arms of the chair against the thighs before starting and it will hold the patient as in a vise. The only way he can get up is to take the chair with him.

As a rule it is foolish to extract a third molar that is as thin as an egg shell as it is a dangerous procedure fishing out the pieces, and if the root is cone shaped it usually shoots out of the forcep. If this occurs drop the forceps, pull the head forward and get out the pieces with your finger.

To prevent pieces of teeth passing down the throat adjust the

patients' head so that the occlusal surfaces of the upper posterior teeth are practically level; this will cause the base of the tongue to rest against the soft palate thereby closing the throat from the mouth.

One of the dangers of using the nasal inhaler for extraction work is the possibility of giving the patient too much gas thus decreasing the reflexes. If one should lose a tooth in this condition the patient can not readily cough it up.

As a general rule it is better to do the work under local anesthesia if the work cannot be done in a minute's time which is the duration of time for painless work when face inhaler is used.

Unless one is naturally quick and adept at extraction work it is well not to experiment with gas machines, as the patient is pretty sure to get poor service unless the case is very easy. It seems that the most difficult cases want gas.

Frequently the tooth is extracted and after the patient has returned to consciousness he states that he felt the pain. This is usually due to the fact that the patient was not completely under when the face piece was removed; again it takes eighteen seconds for the final gas inhalation to reach the nerve centers and if one waits a few moments after removing the face piece the best results will be attained.

—Geo. E. Cox, *Wilmington, Del.*

Setting Up Diatoric Teeth

When setting up diatoric teeth in full vulcanite denture work much time can be saved and more satisfactory results obtained by placing the four posterior teeth *en bloc* in the wax rims of the trial plates, leaving these teeth wired together just as they come from the supply house. This wire framework later becomes part of the finished denture but is entirely concealed by the vulcanized rubber.

The method has these points of advantage: First, it aids in flasking by more securely retaining the teeth in position while boiling out the wax and packing the rubber and, second, it aids in preventing the teeth from becoming dislodged or broken out from the finished denture.

—L. A. Wright, *Dental Cosmos*

Formula of the Fluid Flux That Does Not Pit

Powdered Borax, 7 drachms; Powdered Boracic Acid—C. P., 7 drachms. Put all in a pint bottle and add: Distilled *cold* water, 6 ounces. Shake well until all is dissolved; then filter, pouring back the liquid, until perfectly clear. Put in a 6-ounce bottle and label: "*Fluid Flux.*" Besides this, take a 1-ounce "pomade" bottle for use in the laboratory.—*Oral Health.*

To Prevent Galvanic Action Between Gold and Amalgam

In exceptional cases where it is necessary to insert an amalgam filling which comes in contact with occluding gold, galvanic action may be prevented by painting the amalgam filling with tincture iodine.—*Percy Moore, Oral Health.*

SOCIETY ANNOUNCEMENTS

Indiana State Board

The next meeting of The Indiana State Board of Dental Examiners will be held in Indianapolis from June 12th to 17th, 1922.

For further information address, H. C. McKittrick, Secretary, 1006 I. O. O. F. Building, Indianapolis, Indiana.

Dental Hygienists Association of New York

At Rochester, New York, on May 12th and 13th, the Second Annual Convention of the Dental Hygienist Association of the State of New York will be held at the Rochester Dental Dispensary in connection with the New York State Dental Society meeting. All interested are invited to attend. More detailed information will be published later.

Massachusetts State Board

The Massachusetts Board of Dental Examiners will hold a meeting for the examination of candidates on March 21, 22, 23 and 24. Both dental and hygienist candidates will be examined at this meeting. Applications and fees must be filed at the office of the secretary at least ten days before the examination. For full information, application blanks, etc., address Dr. J. N. Carriere, Secretary, 146 State House, Boston, Mass.

Pennsylvania State

The fifty-fourth annual meeting of the Pennsylvania State Dental Society will be held in Syria Mosque, Pittsburgh, April 11, 12 and 13, 1922. An interesting and instructive program has been arranged. Members holding National Dental Association cards from other states, are cordially invited to attend all sessions.

W. L. FICKES, *Secretary*,
East End Trust Bldg., Pittsburgh, Pa.

National Dental Convention

The twenty-sixth annual convention of the National Dental Association, will be held in Los Angeles, California, July 17th to 21st, 1922.

The Ambassador, one of the city's newest and largest hotels, situated in the heart of one of the most beautiful residential districts, will be convention headquarters and practically all sessions can be held in the hotel or on the grounds.

The Local Committee on Arrangements can safely state that this meeting will provide an excellent program, demonstrating that "Dentistry can add ten years to the average of human life." This committee can also safely state that our visitors will be well entertained during their sojourn in Los Angeles.

It is none too early to plan a vacation, westward, in July 1922 and to send for hotel reservations.

Watch for further and detailed announcements in all Dental Journals.

The Local Committee on Arrangements, per

C. M. BENBROOK, *General Chairman*,

707 Auditorium Bldg., Los Angeles, California.

Alumni Society of the Dewey School of Orthodontia

The next annual meeting of this society will be held on April 27, 28 at the Edgewater Beach Hotel, Chicago. The usual high standard of the meetings of the society will be maintained. All interested in orthodontia are cordially invited to attend these meetings.

GEORGE F. BURKE, *Secretary*,

741-43 David Whitney Bldg., Detroit, Mich.

Tennessee State

The next Tennessee State Dental meeting will be held on May 8, 9, 10, 11, 1922, in Memphis, Tennessee.

Annual Convention Texas State Dental Society

The Texas State Dental Society will hold its 42nd Annual Convention March 13 and 14, 1922 at Houston, Texas.

The special features of the program will be lectures and clinic work by Dr. Boyd S. Gardner, of Rochester, Minn. and Dr. Carl Hoffer, of Nashville, Tenn., with symposiums and unit clinics by members of the Society.

During the four days following, a post-graduate class course will be conducted by Drs. Willis Al Coston, Topeka, Kan.; Russell W. Tench, New York City; Arthur E. Smith, Chicago; T. W. Maves, Minneapolis and Julian Smith, Dallas.

J. G. FIFE, *Secretary*, 1813 Main St., Dallas, Tex.

Kentucky State

The next Annual Meeting of the Kentucky State Dental Association will be held in Louisville, Kentucky, April 10, 11, 12, 1922, Seelbach Hotel as headquarters. A Clinical Program of unusual interest is being arranged. Address all correspondence to W. M. Randall, Secretary, Louisville, Ky.

W. W. RANDALL, *Secretary*, Louisville, Ky.

TRI-STATE MEETING

Missouri, Kansas and Oklahoma State Dental Societies

The Missouri, Kansas and Oklahoma State Dental Societies will hold a joint meeting in Kansas City, Mo., April 10-15, 1922. This event promises to be one of the big and important dental meetings of the year. It will be a big meeting because this will be the annual meeting of each of the three state societies. It will be an important meeting because of the subjects on the program and the manner in which they are to be presented.

The "teaching system" will be used almost exclusively. It is not the intention to present many new things but to have a more thorough and better presentation of many of the older things.

The forenoons of four days will be set aside for lectures to the full attendance by the following well-known men of the profession:

Dr. Arthur D. Black	Chicago
Dr. Howard R. Raper	Indianapolis
Dr. C. N. Johnson	Chicago
Dr. Wallace Seccombe	Toronto
Dr. Arthur E. Smith	Chicago
Dr. M. M. House	Indianapolis
Dr. Frederick B. Noyes	Chicago
Dr. Marcus L. Ward	Ann Arbor

The afternoon of these same days will be devoted to sectional work. The full attendance will be divided into classes and each class will receive an orderly and detailed presentation of the subject under consideration in that section.

SECTIONAL DIRECTORS

Radiodontia	Clarence O. Simpson, St. Louis
Full Dentures	Dayton D. Campbell, Kansas City
Anchor Dentures	Charles Arthur Furrow, Tulsa
Root Canal Technic	W. A. Chamberlain, St. Louis
Pyorrhea and Prophylaxis	J. M. Temples, Tulsa
Casting Technic	E. H. Hart, St. Louis
Office Efficiency and Assistants	C. A. Martin, Winfield
Orthodontia	Hugh Tanzey, Kansas City
Dietetics in its Relation to Preventive	
Dentistry	A. L. Walters, Tulsa
Crown and Bridge Work	W. A. Coston, Topeka
Block Anesthesia	F. C. Reisling, Tulsa
Dental Ceramics	J. E. Huff, Kansas City

There will be one day of general clinics by members of the three state societies.

Owing to the fact that the amount of dues collected by most dental societies, are just about enough to pay for "janitor services," it will be necessary to collect a very small fee from each person attending this meeting. Members of other state dental societies are most cordially invited to attend this meeting on the same conditions as our own members, viz: you must be a member of your state society with your 1922 dues paid in full. Each person must present his 1922 membership card for registration. These rules will be rigidly enforced. The dental society is the greatest educational factor in our profession, hence the benefits to be derived from attendance at a meeting of the magnitude

this one promises to be, should make a strong appeal to the members of the profession of this section of the country.

The Tri-State Dental Bulletin will be mailed to any one interested in the details of the meeting, upon request to the secretary.

E. M. HALL, *Chairman*,
Kansas City, Mo.

C. R. LAWRENCE, *Secretary Treasurer*,
Enid, Oklahoma.
Of the Organization Committee.

Kansas State Board

The Kansas State Board of Dental Examiners will hold its next meeting in Wichita, Kas., June 19-23, 1922, to candidates for license to practice in Kansas. Write the Secretary for application blank and any other information.

G. F. Ambrose, *Secretary*,
El Dorado, Kansas

AN INVITATION—You are cordially invited to attend the session of the Southern Society of Orthodontists which convenes on the mornign of March 14, 1922, at the Piedmont Hotel, Atlanta.

Your Mid-Winter clinic card will admit you. The program is complete with excellent papers and clinics.

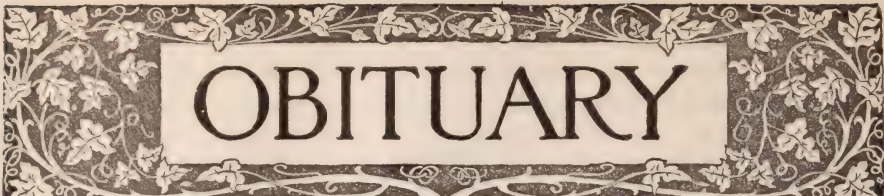
EXECUTIVE COMMITTEE.

Northern Ohio Dental Association

The Sixty-fifth annual session of the Northern Ohio Dental Association will be held at Hotel Statler, Cleveland, Ohio, June 5, 6 and 7, with Post-Graduate Course following. It will be a "hummer."

Rehwinkel Dental Society

To accommodate speakers and clinicians, the date for holding the annual midwinter meeting of this Society has been changed to Saturday, March 8, 1922, at Chillicothe, morning, afternoon and evening. Among the speakers will be: Drs. Casto, Gentilly, Custer, Furnas, Schott, Seamans, Rauch; and such Clinicians as: Drs. Starr, Knoderer, Thorpe, Jones, Busch, Mills, Custer, Pelle, Martin and others. A large number of exhibitors will be in attendance. Banquet in the evening. Come and bring your friends.



OBITUARY

DR. CARL E. UHLE

RESOLUTIONS ADOPTED BY THE MAD RIVER VALLEY
DENTAL SOCIETY

Whereas, We the members of the Mad River Valley Dental Society, have by the call of the Creator, had one of our members, Dr. Carl E. Uhle, removed from among us, and,

Whereas, Dr. Uhle possessed many lovable traits and good fellowship which made him a favorite companion to all who knew him, and,

Whereas, Our community has thereby lost a citizen, held in high honor and esteem, our society and profession has lost a skilled and zealous member, and the family a kind and devoted husband and father, therefore, be it

Resolved, That we the members of the Mad River Valley Dental Society, do hereby express our sorrow at the loss we have all sustained and offer our sincere and heartfelt sympathy to the family under a sensible impression of the great and irreparable loss which they have sustained, and be it

Resolved, That, in tribute to his memory, a page of our minute book be set aside and a copy of these resolutions be spread thereon and a copy thereof be sent to the family.

Signed: H. H. SCHMIDT

W. A. BOWER

GEO. M. SEWARD



OFFICERS

W. H. HISEY, 1201 2d Natl. Bank Bldg.
President

G. E. MARKLEY, 320 Superior
Secretary

C. H. COX, 714 Nicholas Bldg.
Vice-President

F. B. CONKLE, Wedgewood Bldg.
Treasurer

Wednesday, Feb. 22, at high noon in the home of Mrs. Jane Helm, of Glenwood avenue, occurred the marriage of her daughter Dolly Hazel, to Dr. William W. Penske, son of Mrs. Augusta Penske.

Rev. Thomas Klinsik, of the Salem Lutheran church, officiated at the ceremony, and Miss Hazel Hull played the wedding march.

The bride was unattended.

The ceremony was said in the living room before the fireplace which was banked with palms and ferns, with jonquils giving the floral note. Red roses were used in the dining-room where a wedding luncheon followed the service.

Dr. Penske and his bride left in the afternoon for a trip, and they will be at home after the 15th of March at 2325 Monroe street. Mr. and Mrs. Howard Pickering, of Chicago, were the only out-of town guests.

A marriage of much interest to Toledo social circles was that of Miss Gertrude McDonnell, daughter of the late Mr. and Mrs. T. J. McDonnell to Dr. Robert H. Vollmayer, son of Mr. and Mrs. John Vollmayer, which was solemnized at 10 o'clock Saturday morning, Feb. 25, in the Cathedral Chapel.

Only the immediate families were privileged to attend the ceremony at which Rev. Anthony J. Dean officiated. A breakfast to members of the family was served in the bride's home on Parkwood avenue following the church service.

Mrs. Joseph Gallagher, of Philadelphia, sister of the bride, was the only out-of-town guest.

Dr. and Mrs. Vollmayer left for California and after a sojourn in the West will reside in this city.

DR. C. E. TENNEY

As this issue goes to press we are saddened by the news of the death of Dr. C. E. Tenney, of Toledo, Ohio, at his home, 2628 Scottwood avenue, Monday noon, Feb. 27, 1922, from the effects of a severe attack of influenza. Dr. Tenney has been a practicing dentist for 36 years, 11 of which he has been in Toledo.

Dr. Tenney was a native of Troy, Ohio, and received his early education in the schools there. He was graduated from the Ohio Dental college at Cincinnati. Prior to coming to Toledo he had been a resident of Sidney, Ohio. He was a member of the Chamber of Commerce and the Collingwood Presbyterian Church.

He is survived by his wife, his father, W. I. Tenney, of Troy; sons Capt. G. E. Tenney, Springfield, Mass., who has just returned from the Philippine islands, and Irving Tenney, a student at Ohio State University; brothers, F. W. Tenney and Horace K. Tenney, of Troy; Dr. W. H. Tenney, of Toledo, and Dr. George L. Tenney, of Chicago, and sisters, Miss Ida Belle Tenney and Mrs. A. Byrd Shellabarger, of Troy.

Funeral services were conducted Wednesday morning, at his home. Interment, Sidney, Ohio.

**Method for Preventing Buckling of Extensive Bridge Work
by Controlling Shrinkage of Solder**

The soldering of extensive bridge work involving the incisor teeth and the bicuspid on either side is always attended by more or less buckling of bridge because of shrinkage of large body of solder used.

No investment compound will of itself prevent this shrinkage.

Latter can, however, be effectually controlled by use of tinfoil incidental to waxing up of teeth on model.

Cover incisor area of model with tinfoil before waxing up teeth, carrying foil up about sides of abutment crowns, then when teeth are backed up and adjusted to position this entire section of teeth between the crowns can easily be removed, separately invested and soldered and returned to its proper position on original model.

Latter is then invested in usual way, and by use of little more solder the section is attached to the abutment crowns and the objectionable buckling thus overcome, the shrinkage having been confined to the section of teeth previously soldered.

I have experienced most gratifying results from this procedure, and am anxious others should profit by it. —*Dr. R. V. Blake, Dental Digest*

WHAT WE MEAN BY

“Best Since 1812”

“I have no doubt that Ney’s Golds are best since 1812, nor that the best dentists have always so regarded them, but why eternally repeat ‘Best Since 1812’?”



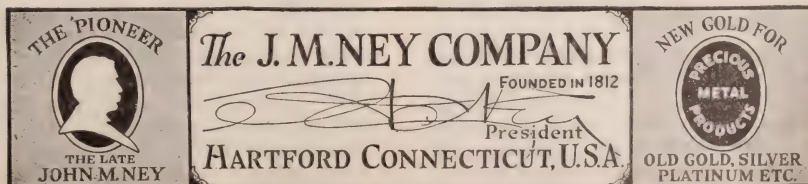
That is a fair question, and here is the answer:

First, we wish to convey the historical fact that the firm of Ney, established in Hartford in 1812, has given the dentists of America 110 years of continued service.

Second, this slogan is intended primarily for its influence on ourselves and our employes, as a constant reminder that we have a distinctive standard and a reputation for service that every day in the year we must live up to.

Third, it constitutes a perpetual challenge to our patrons, leading them to expect greater refinement of products and a higher degree of uniformity than they expect from anybody else.

Fourth, we wish to induce the younger generation of dentists entering practice to put us to the test, that we may serve them as we have served their predecessors for 110 years.



NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

To Readers of N. and O:--

The letters that have come to me during the past month have been more than usually encouraging. They have included many requests for advice and other service along financial and professional lines, all of which have had the attention of our Service Department; also, many expressing high appreciation of the work that The Summary and its publishers are trying to do. One reader writes that he believes in handing out a few bouquets while the recipient is alive, rather than wait until he is dead; and all of them write most encouragingly, some even inquiring if there is anything they can do to help The Summary. We thank every one of them most heartily; and to the latter we say:

There most certainly is something that every reader of The Summary can do to help. Probably everybody knows that no magazine, particularly no dental magazine can begin to pay its own way from receipts from subscriptions. As a matter of fact, advertising patronage must carry by far the greater burden of the cost of publication, and continued advertising income depends entirely upon the value of the space bought and paid for. Unless advertising brings results in inquiries, it can have no value.

Here, then, is one way in which every reader of The Summary can help: Read the advertising pages each month, and make it a part of your routine to write a line to the advertisers, each of them, requesting further information, literature, etc., and be sure to say that you saw their advertisement in The Summary. When attending conventions and visiting the exhibits, say that you saw the goods advertised in The Summary. And buy the goods whenever possible.

And here is another: If every subscriber will make a little effort he very easily can secure one more subscriber, maybe two or three. That would be a fine help. We shall appreciate such efforts very greatly. If any present subscriber will secure and send to us only three new names, with the amount, \$1.50 each, we will advance his own subscription three months. This may not seem very much; but when you consider that every copy of The Sum-

mary costs us just about twice as much as we get for it in the subscription price, you will realize that it is not at all illiberal.

How many of you will do this much to help make The Summary bigger and better? I shall be glad to have a card from everybody.

During the past month my services have been in rather active demand. On January 17th I visited Cleveland and had the pleasure of addressing the dental student body at Western Reserve University on fundamental business topics. The attendance was large, in spite of many counter attractions, including the outdoor skating amphitheatre on the campus—one of the most attractive scenes I ever have witnessed. On January 31st I addressed the Northeastern Ohio Society at Painesville on business topics in the afternoon, and the Episcopal Men's Club in the evening on Diet, for Efficiency, Comfort and Health. The Dental Society in a body attended the evening meeting as guests of the Club. I do not pretend to be a McCollum by any means; nevertheless what was given was well received. I am indebted for special courtesies to Drs. Park, Cunningham and many others. On January 26, by invitation of the Students' Dental Society of the Michigan State University Dental School, I visited the beautiful city of Ann Arbor and addressed that body on business topics, generally. Many of the Faculty honored the meeting by attending, and I am indebted to them as well as to the officers of the Society for courtesies too numerous to mention, except one that stood out above all the others: I had the very great pleasure and satisfaction of spending a night and the greater part of a day as the guest of the splendid Michigan Union club. I felt very much as I suppose the middle-age baron may have felt while walking about the spacious halls, towers and apartments. The Tap Room was particularly interesting, as there I was able to come into contact with the student in his own particular lair. One unique feature of this room is the ancient table-tops embedded in the ceiling, bearing the carved signatures or initials of many a student since known to fame. One could

easily spend a day deciphering them with interest.

On March 20 I begin an engagement of three days before the Arkansas State Society, away down at Little Rock. I shall speak on business topics, professional efficiency and diet before the Society, and am also to address the high-school teachers, pupils and their parents on oral hygiene. This is my second trip to Little Rock, having been there for two days last year. It is beginning to dawn on me that I must really have something to say, or people would not care to have me return.

To dental societies, program committees and others, I wish to say that my services are available along my lines of service, at almost any time, provided I am given sufficient advance notice. I really have made my topics the subject of considerable study and experiment, and seem to present my material in an interesting manner.

A letter from Dr. C. E. Hines, Memphis, Tenn.: "I want to commend you for the stand you are taking with regard to diet in News and Opinions. When you say that diet has more to do with dental caries, pyorrhea and other mouth troubles than all other causes combined, you uttered a truth that can no longer be overlooked by the dentist if he would give his patients the service to which they are entitled. I join with you daily in preaching this doctrine, for it is common sense, and, after all, that is the only kind of sense that means anything."

Such letters are very encouraging. Let me have more expressions of opinions. This Department should be the avenue through which all of our opinions may be expressed—yours, as well as mine.

One hundred and fifteen dentists were licensed to practice in Minnesota last year. Twenty-six applicants were rejected.

Wisconsin supreme court has decided that it is not necessary for a dentist to obtain the consent of a patient before extracting a diseased tooth. In other words, the Court recognizes the dentist as responsible for the health and welfare of his patient, as a professional man. This is a long step in the right direction. Now if we can only get the dentist also to recognize his responsibility.

Why not a dental car in each state? My observation leads me to believe that the work that might be done by such a car would be the best, the quickest, and much

the cheapest method of convincing the public of the need of regular and systematic examination and care of the teeth. Some of these days the moving-picture film is going to cut a big figure along dental-educational lines. I may have something to say about that later.

The Chicago dental society at its recent convention, voted 1250 to 150 against the proposition to exempt beer and light wines from the operations of the national prohibition laws. Personally, I should have no objection to such exemption in and of itself; but as an entering wedge, pointing to a possible return of the bad old saloon days—nothin' doin'! To my way of thinking the saloon was the very worst element in our life; and the worst feature of it was that it made all other forms of degradation possible and easy. Prohibition as a political question never interested me for a minute. But the moral and scientific sides of it are quite other stories.

A movement is on foot up in Canada to make dental offices the object of official inspection with the purpose of seeing that every one of them is properly equipped and is conducted in accordance with sanitary and hygienic regulations. Good idea. Wonder how it would work here?

It you haven't begun reading Dr. Lurie's Penetology Department better begin right now. He is getting down to fundamentals in his first papers, laying a foundation upon which I do not hesitate to predict the building of a department of immense value to every reader.

An interesting legal article this month from Mr. Buckley on the legal responsibility of banks in paying forged checks. Read it. May save you some money.

Free dental clinic was established at Pontiac, Mich., January 15, under the management of Dr. P. B. Jones of Flint, formerly a member of the public dental staff of that city. Every city in America should be made acquainted with the Flint Idea, and how it has been carried out. A request mailed to Dr. W. R. Davis, Flint, will bring full information.

According to report made by the U. S. bureau of education, 286 cities have established free clinics in connection with the public schools. Which is encouraging; but think of the work still to be done.

Macon, Ga., is raising money to establish a free school clinic.

A properly balanced and correctly mas-ticated diet will, in my opinion, go far to prevent a very great majority of the ills to which human beings are subjected. It also is my opinion that no diet need be expected to "cure" anything. Prevention is



Figure it out for Yourself

—the advantages in the use of Trubyte teeth far outweigh the fictitious savings in the use of substitutes.

WHEN you think of yourself as a professional man, rendering service of great value to the health of those who place themselves in your care, you begin to realize more fully that it is your knowledge and skill applied to certain materials which make the service valuable.

Regardless of professional attainments it is just as impossible to render service worthy of you and of your profession with inferior materials as it would be for the old-time bookkeeper with his antiquated methods to keep the accounts of a modern business, no matter how honest his intentions.

Trubyte

—the teeth of modern dentistry

“Figure it out for yourself”—does it pay to handicap yourself with teeth of a bygone day when Trubyte teeth permit you to render a service far superior to what was possible in the past?

Does it pay to give your best knowledge and skill and find your reputation hurt, because inferior teeth were lacking in both strength and appearance?

Does it pay to use “cheap” teeth and produce makeshifts, when with Trubyte teeth you can make dentures of character which enhance your reputation and attract patients who seek the best and pay for it?

Does it pay to figure in pennies on the cost of the genuine when imitations are offered?

Does it *ever* pay to compromise with inferiority when the highest quality is within your reach?

RESTORATIONS  THAT RESTORE

Your Dealer or Direct

The DENTISTS' SUPPLY COMPANY

220 West 42nd Street

New York City

the only safe line of conduct. Get over on the safe side and stay there.

A Brooklyn dentist has been mulcted by the courts in the amount of \$10,142 for allowing a piece of a broken root to slide down a patient's throat, resulting in traumatic pneumonia. "Better be safe than sorry."

Dr. P. C. Lowery, of Detroit, has a new lecture on Facial Expression in Denture Construction. Program committees take notice.

When did the Chicago dental society become the National Association? Hundreds of items have appeared in the lay press crediting proceedings of the Chicago meeting to the larger body. Somebody slipped a cog again.

A medical and dental realty concern has been organized at Indianapolis for the purpose of erecting a million dollar office building for the exclusive use of members of the two professions—or of the two branches of one profession, depending altogether upon "how you hold your mouth."

There is a growing demand for popular low-fee dental clinics to provide for service for those who are not indigent but

who cannot pay the fees asked by most established offices. The idea is a good one. It is something of the kind or no dental service for a large proportion of our urban population.

Dr. Arthur D. Black, Chicago, is Chairman, Dr. Guy S. Medbury, of San Francisco, Vice-Chairman, and Dr. B. B. Byrnes, vice-dean of the Southern-Atlanta Dental College, is Secretary of the Council of Administration of the American Institute of Dental Teachers, recently organized at Montreal to promote dental education in the U. S. and Canada.

Bulletins, Reprints or Circulars Wanted

We are constantly in receipt of requests for reprints, bulletins and circulars which report work of dental clinics or community dental dispensaries or rural dental work.

We would request the different dental clinics, oral hygiene committees and health officers to furnish us with a hundred copies of any printed matter containing this information so that we may distribute it throughout the country and thus help every effort to popularize and establish dental clinics or dispensaries.

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BUSINESS QUESTIONS

Answered by Mr. Elton J. Buckley,
Philadelphia, Pa.

(1)—“What is the legal status in Ohio of the holder of a second mortgage on real estate? Can he force foreclosure proceedings without consent of holder of first mortgage? Or with his consent? Mortgage dated last March. First mortgage provides for payment of interest only for three years; then monthly payments for a long term of years.”

Ans.—A second mortgagee in an ordinary course can foreclose without regard to the consent of the first mortgagee. He is not obliged to consider the first mortgagee at all but is obliged to consider whether or not the sale or foreclosure of the second mortgage will yield enough to protect the second mortgagee after the first is taken care of because of course the first mortgage has precedence.

(2)—“Do dividends once declared from actual earnings during any one year become lien on the corporation if not paid? That is, are dividends, unpaid, a liability that

must be discharged some time, in some way?”

Ans.—After a corporation through its Board of Directors has admitted earning a certain sum of money and the Board of Directors has declared such sum as a dividend the matter becomes a liability which can be realized upon by any stockholder.

DEATHS

At Greensburg, Ind., January 19, Dr. Orlando Burns, aged 64.

At Woodbine, Iowa, January 16, Dr. Guy Landee lost his life in an automobile accident. He was driving alone, and was not found for some hours.

At New York, January 13, Dr. Clinton H. Leighton, aged 60.

At Brookline, Mass., January 17, Dr. Charles A. McGinley, aged 52.

At Baltimore, Md., January 14, Dr. Wallace B. Bruce, of injuries received during the World War.

At Fon du Lac, Wis., early in December, Dr. P. H. Welch, aged 52. Dr. Welch was, as a young man, famous as a professional baseball player, having served on most of the major teams.

At Mena, Ark., January 14, Dr. Albert E. Wiley, aged 73.

At Metaline Falls, Wash., January 18, Dr. H. E. Neelands, dentist and banker, aged 41.

At Wellsburg, W. Va., January 20, Dr. E. E. Worthen, retired, aged 80.

At Nebraska City, Neb., January 25, Dr. John Bland Ballard, aged 58.

At Vicksburg, Miss., December 30, Dr. T. D. Cooper, formerly of Jackson, Tenn.

At Atlantic City, January 26, Dr. Moore Stevens, aged 53.

At Independence, Kans., January 26, Dr. J. J. Smith.

At LeRoy, N. Y., January 26, Dr. Archibald Seeley, aged 86.

At Boston, January 30, Dr. Charles Elmer Hale, aged 66.

At Corning, N. Y., January 31, Dr. Roswell Edwin Sunderland, aged 60.

At Pottsville, Pa., January 31, Dr. B. L. Pinkerton.

At Indianapolis, Ind., January 30, Dr. Oscar F. Britton, aged 84.

At Auburn, N. Y., February 4, Dr. George B. McClellan Atkinson, aged 60.

At Augusta, Me., Dr. Warren Lenwood Smith, aged 33.

At Rochester, N. Y., February 6, Dr. C. W. Klatte.

At Windsor, Ont., February 7, Dr. Clarence W. McIntyre.

At Janesville, Wis., February 7, Dr. Charles T. Pierce.



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At Selma, Ala., February 12, Dr. Archibald T. Reeves.

At Halifax, N. Y., February 12, Dr. Frank H. Woodbury, retired, aged 70.

Mr. Robert E. Hastings.

The death of Mr. Robert E. Hastings, senior partner of Morgan, Hastings & Company, filling gold manufacturers, Philadelphia, on January 31st, 1922, in his 79th year, marked the end of a remarkably active business career.

Mr. Hastings became associated with the firm in 1863 and has been the active head since the death of his father in 1865. His ideas were always in the lead in the industry and in conjunction with his brothers, Mr. John V. Hastings and Mr. Henry O. Hastings, built up the business to be one of the largest of its kind in the world. He was a man of keen judgment and quick decision. His character was one which drew men to him, and when they spoke of him it was always with reverence and respect. He will be a great loss to the trade, and his many friends in it.

He is survived by his brother, Mr. John V. Hastings, who has been his partner for fifty-six years, who will carry on the business as it has been conducted for so many years, with the aid of his son, Mr. John V. Hastings, Jr., his nephew, Mr. G. Brinton Thomas, Jr., and Mr. Cornelius E. Ebrey, all of whom have been connected with the firm for many years.

Thus the firm which has already been in existence 102 years still remains in control of the same family, it being one of only about sixty firms in the United States who are 100 years old and still owned by descendants of the founder.

Dr. Henry T. Justi.

Philadelphia, Pa., February 6.—Henry D. Justi, well known for his philanthropies and a pioneer in the dental supply business, died yesterday at his home, 3401 Baring street. He was 88 years old. Death was due to a complication of diseases.

In 1857 Mr. Justi established a dental supply house at 516 Arch street. As a result of the increase in business he subsequently moved to Thirteenth and Arch streets. The present establishment at Thirty-second and Spring Garden streets is conducted under the name of H. D. Justi & Son.

Mr. Justi was a member of the Lutheran Church and the Masonic fraternity. He is survived by a widow, Elizabeth C. Justi, a son, Henry M. Justi, and two daughters.

Ohio—Central.

Marion, O., February 1.—Dr. R. C. Bratton, of Galion, was elected president of the Central Ohio Dental society, succeeding Dr. John Pfannstiel, of Delaware, at the tenth annual meeting of the society.

Other officers chosen are Dr. Z. B. Houghton, Marion, first vice president; Dr. J. P. Brooks, Richwood, second vice president; Dr. J. C. Thuma, LaRue, recording secretary; Dr. C. S. Kirk, Galion, corresponding secretary; Dr. F. C. McGaughy, Galion, treasurer, and Dr. Christian Jensen, Mt. Gilead, director of the Ohio State Dental society.

Luncheon was served at the close of the morning session and the afternoon program was opened at 1:30 o'clock with an address by Dr. W. A. Whitacre, of Delaware, on "The Value of the Use of the X-Ray in Dentistry." Dr. W. E. Knight, of Delaware, discussed "Dangers in the Use of the X-Ray in Dentistry." The subject of "Oral Surgery as a Specialty" was taken up by Dr. F. R. Mann, of Marion. Dr. M. May Mills, of Delaware, spoke on "The General Practitioner in Orthodontia." The speaking program was closed by Dr. A. F. Linscott, of Marion, with an address on "Affections of the Maxillary Sinus."

Memphis Dental Clinic.

Memphis, Tenn., January 27.—What it is said, will be the first dental clinic built for private use in the United States is to be added to group of hospitals and clinics on Madison ave., east of Dunlap st.

Drs. W. T. Arrington, R. E. Baldwin and W. W. Oursler, together with a staff of dentists to be announced later will occupy the building. The clinic building will be located just east of Baptist Memorial Hospital.

The building will contain 18 operating rooms, laboratory, sterilizing room, X-Ray room, reception room and executive offices. Parking space for automobiles of clients will be reserved in the rear. The building will be approachable by a circular driveway to the front entrance on a drive leading to a side entrance. The building will be of French classic architecture with flat roof.

Work will begin at an early date and completion is expected by July 1. It will cost approximately \$40,000, and every modern facility for the practice of dentistry and dental surgery will be installed.

A free clinic for patients who are unable to pay for their work will be established in the basement and this free clinic will be equipped with the same modern facilities as the clinic for pay patients.

Indiana—Thirteenth District.

South Bend, Ind., January 12.—Dr. R. M. Hitchcock of LaPorte, Ind., was elected to head the 13th District Dental society for 1922 at the annual conference held at the Oliver hotel Wednesday. Dr. Clem Shidler of South Bend was elected vice president. Dr. Van Kennedy of Elkhart secretary and Dr. C. L. Menges of Elkhart treasurer.

Business sessions were held in the Pink room both in the afternoon and evening. Dr. William Harper of Chicago, the principal speaker read a paper on "Amalgam." Following the talk short practical demonstrations on the subject were made.

A banquet held in the Turkish room at 6:30 o'clock followed by a brief business session, completed the program. About 40 dentists of the district were in attendance.

NEW BUILDING FOR MICHIGAN**Plans Made for Large Addition to Dental School Facilities**

Ann Arbor, Mich., Jan. 31. (Special)—Borings have been made for the excavations, and complete plans have been drawn for the new addition to the Dental College of the University of Michigan. The building is to be of the same type and appear-

ance as the present structure, and when completed, the north wall of the old part will be removed and all will be one building.

This addition will provide an increase of more than 100 per cent in three of the most crowded departments. The clinic will contain 200 operating chairs instead of the present 90, and the junior and sophomore laboratories will accommodate 562 instead of the present 249.

"The enlarged building will enable the university to graduate 200 students every year," says Dean Marcus L. Ward.

Dr. John P. Carmichael, originator of the Carmichael inlaid attachment, three-quarter crown, and the line of "Carmi" prophylactic materials was tendered an honorary dinner by the Rochester, N. Y., dental society, January 5. About fifty attended. Following the dinner Dr. Carmichael addressed the society on his specialties. On January 12, by invitation, Dr. Carmichael appeared before an audience numbering over 500, at 1, Union square, New York, and delivered a screen lecture on his three-quarter crown sanitary fixed bridges, extension fixed bridgework, and the treatment of pyorrhea. The lecture was followed by clinics by S. G. Supplee, and others. There is no doubt of the value to denistry of the work Dr. Carmichael is doing, and it should be more widely known.

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From an Appreciative Reader

To the Editor of The Dental Summary—Dear Doctor:—I believe in giving men a few flowers while they are alive, and not reserving them until they are dead. I have just finished reading my January number of The Dental Summary and I gleaned more real information from it in one hour than I thought it possible for any man to do.

I take several dental magazines, and take great pleasure in reading them; but I believe I like The Summary the best. It is a real live magazine. Allow me to congratulate you as the editor.

Yours very truly,

Earl J. Thee, D. D. S.
Los Angeles, Calif.,

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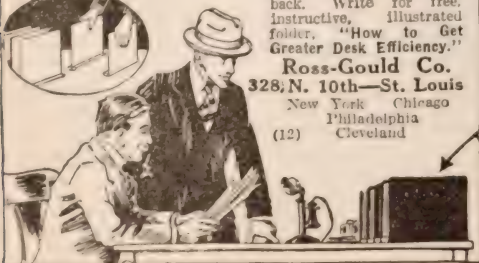
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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XLII

APRIL, 1922

No. 4

ELECTIVE LOCALIZATION OF PERIAPICAL BACTERIA*

BY CARL D. LUCAS AND J. A. WARVEL, INDIANAPOLIS, IND.

BACTERIOLOGICAL INVESTIGATION OF THE PERIAPICAL tissues of pulpless teeth, covering a group of over three hundred inoculations from the tissues of such teeth, all inoculations having been made upon aerobes media, demonstrated that over ninety-five percent of pulpless teeth are pathogenic.

Realizing that micro-organisms which have their habitat at the apices of tooth sockets must necessarily perform their metabolic functions in negative oxygen tension, we determined to follow up the aerobic cultural group with a second investigation which began in June of last year, planting our inoculations in anaerobic media. The media used in this group of twenty-eight cases is acitis dextrose brain broth which Dr. E. C. Rosneau has developed for culturing both aerobes and anaerobes.

Quoting from Dr. Rosneau's monograph upon "Studies of Elective Localization" reprinted from the Journal of Dental Research, Vol. 1, No. 3, Sept., 1919, regarding this medium and its preparation, we find the following:

"Two mediums, dextrose brain broth and soft dextrose brain agar have been found especially useful. They are prepared from meat infusion or beef extract in the usual way, and titrated so that the final product is from 0.5 to 0.7 acid to phenolphthalein. Both of these mediums are placed in test tubes so that the column of media is at least 8 c. m. tall. These mediums are then sterilized in an autoclave at fifteen pounds pressure for fifteen minutes or in an Arnold Sterilizer on three successive days. Dextrose, from a concentrated solution, is added to both mediums after sterilization to make them 0.2 per cent dextrose; also decolorized acid fuchsin (Andradi's indicator). The addition of ascites fluid, blood or serum, just before use, while advantageous in special instances, is found unnecessary for routine work. The brain substance renders the bottom of the tube anaerobic; the top necessarily aerobic and it follows that every gradation of oxygen pressure occurs between these two points. The growth in these liquid mediums almost invariably begins at the bottom of the tube and then forces its way upward, in some instances to the top of the medium within twenty-four hours, in others in forty-eight to seventy-two hours; or not at all. Tall tubes of broth made from meat infusion, to which five per cent of blood is added and 0.5 per cent of dextrose from a concentrated solution just before use, have proven especially useful in studying the localizing power of bacteria from dental foci.

The liquid mediums are especially useful for studying the localizing powers of the primary culture, but they give little indication as to the number of bacteria present in the material inoculated, and one contaminating organism from the air or elsewhere may outgrow the more parasitic organisms contained in the material under consideration. The agar medium in conjunction with a study of smears of the material inoculated, furnishes quite accurate information as to the number of bacteria contained in the material inoculated

*Read before the Indiana State Dental Association, Indianapolis, 1921.

and should be used as a control of the liquid medium. In the agar medium, contaminating bacteria do not outgrow those contained in the material inoculated. The bacteria live for a long time and the properties on which elective localization depends may be retained in the deep colonies for a longer period than when grown aerobically, so that transfers to the liquid mediums for animal injections may be made at a considerable period after growth has occurred."

Our group of cases consisted of inoculations directly into dextrose brain broth, from the apices of tooth sockets from which pulpless teeth had been extracted, under rigid aseptic precautions, by transferring the material with a sterile platinum loop.

The cultures were then incubated for from twenty-four to seventy-two hours at 37 degrees C.

The resultant growths were then smeared and differentially Gram stained for identification of the organisms, also by cultural characteristics (Blood agar plates and sugar media).

Careful physical diagnoses of the patients were determined and recorded, together with the bacteriological findings deduced from the cultural technics.

Medium-sized rabbits were then inoculated with given cultures, with doses ranging from 2cc to 10cc from the anaerobic cultures of individual patients.

Within from twenty-four to forty-eight hours after their inoculation, the rabbits were either anesthetized or killed and carefully examined for lesions.

Cultures were made routinely on blood agar plates and in glucose brain broth from the lesions, and from the blood, joint fluids, kidneys, glands, spleen, bile and urine.

The character of the lesions was determined by examination of stained sections of tissues, and the bacteriological identification of the organisms was then determined by making cultures of the different body fluids.

We found that such a group of studies, carried to logical conclusions, required an enormous amount of time, great detail and precision, therefore the laboratory technics became very laborious, and the results warranted collaboration with a highly trained, skillful, and scientifically enthusiastic laboratory technician. Therefore, the details of the laboratory routine were placed in the hands of Dr. J. A. Warvel, technician of the Methodist Hospital, and we wish at this time to assign all of the credit for these studies to our esteemed friend, Dr. Warvel, than whom, we are pleased to assert, there is no scientist more competent for detailed research investigation.

Dr. Warvel freely and enthusiastically entered into this research, and we feel that our profession owes to him a debt of deep gratitude for his untiring efforts in the investigation of these presents, and your confrere at this time wishes to publicly accredit to Dr. Warvel the sincere thanks of the profession for his aid in this compilation of facts.

We wish to submit the results of detailed and complete reports of three cases from our series of twenty-eight studies, presenting the cases individually, covering the phases of dental and physical diagnosis, from history charts, the results of bacteriological findings, animal inoculations, resultant

metastatic animal sequellae, deducted from post mortem examinations of the organs of the animals.

LABORATORY TECHNICS

The following experiments were carried out on twenty-eight rabbits, using the technic as advised by Rosneau of the Mayo Foundation. The studies were made from the teeth-cultures of twelve patients. In four of the twenty-eight rabbits, we were able to produce lesions which we believe illustrate the selective affinity of organisms for certain tissues, corresponding to the anatomical lesions which were present in the patient from whom the cultures were obtained.

Certain constant changes were found in nearly all of the animals studied, but this is to be expected when we consider the amount of bacteria which were suddenly thrown into the blood stream and the resultant toxemia from the same. Therefore, we were not surprised to find evidence of inflammatory reaction in the lungs of all animals autopsied, or some slight changes in the parenchymatous structure of the kidneys, but the unusual occurrence of inflammation in a single nerve of only one of the animals, or the presence of a gastric ulcer in only one case, or vegetations on the heart valves of a few of the rabbits, are considered as logical evidence of the selective action of these particular strains of bacteria for certain tissue.

We were unable to produce joint lesions in any of the three rheumatic cases studied. We believe our failure here was due to the fact that we autopsied at too early a date after inoculation.

We would like to report three cases from our series. We feel that they are illustrative of the specificity of bacteria for certain tissues.

Case No. 1. Mr. A. L. McK, age 35, weight 172, normal weight 210. Reported for examination and diagnosis on date of October 6, 1920.

DENTAL DIAGNOSIS

Faradic Test—Upper left second bicuspid, upper right second molar, lower right first and second molars, negative. Upper right second molar, lower right first and second molars, incomplete canal fillings. No refraction.

Gums: Incipient periodontoclasia.

PHYSICAL DIAGNOSIS

Tonsils: Out—crypts of fauces clean.

Pharynx: Negative.

Sinuses: Negative.

Glands: Submaxillary—hypertrophy.

Bowels: Chronic constipation.

Stomach: Negative.

Influenza: January, 1919.

Pneumonia: Negative.

Malaise: Marked.

Insomnia: Marked.

Psychopathy: Extremely neurotic.

Arthritis: Negative.

Arthritis deformans: Negative.

Myositis: R. & L. Trapezii muscles.

Otology: Negative. Ophthalmology: Negative.

Cephalalgia: Negative.

Neuritis: Negative.

Heart: Metastatic myocarditis.

Blood Pressure: Systolic 128, Diastolic 76.

Pulse Pressure: 52.

Palpitation: On slightest exercise.

Endocarditis: Negative.

Myocarditis: Very marked.

Pericarditis: Negative.

Intermittance: Marked every third, seventh and ninth pulsations successively.

Murmurs: Aortic Regurgitation.

Pulse: 102. Temperature: 98. Respiration: 20.

Urine: Glycosuria: Negative. Albuminuria: Negative.

Color: Straw. Reaction: slightly acid. Specific Gravity: 1.007.

Tuberculosis: Negative history.

Syphilis: Negative history.

Wasserman Reaction: Negative, two tests.

Pulpless teeth removed, using novacain anesthesia at hospital in three stages in November, 1920, operations being performed about three days apart.

Case No. 1. Mr. A. L. McK. Rabbit No. 21. Upper left second bicuspid.

Culture of tooth shows streptococcus viridins.

Rabbit inoculated with 5cc of 48-hour growth on dextrose brain broth, November 11, 1921.

Animal autopsied November 14, 1921.

Heart's blood culture shows streptococcus viridins.

CHEST—

Heart: Enlarged and pale in color.

Lungs: Normal.

ABDOMEN—

Stomach: Normal.

Intestines: Distended with gas, otherwise normal.

Liver: Normal except for small white spots on the anterior surface of left lobe.

Pancreas: Normal.

Kidneys: Normal in size, but pale in color. Pelvis of left contains small amount of pus.

Bladder: Contains quantity of thin pus.

Spinal Cord: Normal.

Joints: Normal.

Nerves: Normal.

Muscles: Normal.

MICROSCOPIC EXAMINATION OF TISSUES:

One. Heart: Muscle strands are separated. Nuclei of cells in many areas are lost, and in other sections stain but faintly. There is an inflammation between the strands of muscle fibers as shown by the infiltration of polynuclear cells.

Two. Liver: Round cell infiltration around the bile ducts and blood vessels.

Three. Kidneys: Glomeruli are shrunken and contain many white blood cells. Epithelium of collecting tubules have pale staining nuclei and the lumen in many places is obliterated.

In this case, the most marked pathology is in the myocardial changes. The changes in kidney are possibly due to the bacteremia with the filtration of bacteria through this structure.

Case No. 2. Mrs. A. S., age 41, weight 142, normal weight 155.

Reported for examination and diagnosis on date of October 18, 1920.

DENTAL DIAGNOSIS

Faradic Test: Upper right second bicuspid and upper left lateral incisor: Negative.

Pulpless Teeth: Upper right second bicuspid and upper left lateral incisor: Incomplete canal fillings, no rarefaction.

Gums: Normal.

PHYSICAL DIAGNOSIS

Tonsils: Cryptic—infection.

Pharynx: Negative.

Sinuses: Negative.

Glands: Normal.

Bowels: Chronic constipation.

Stomach: Negative.

Influenza: Negative. Pneumonia: Negative.

Malaise: Marked. Insomnia: Negative.

Psychopathy: Neurotic.

Arthritis: Polyarthritic.

Arthritis Deformans: Negative.

Myositis: Negative.

Otology: Negative. Ophthalmology: Negative.

Cephalalgia: Chronic.

Neuritis: Left arm and shoulder.

Heart: Pulse rapid, weak and irregular.

Blood Pressure: Systolic 162, Diastolic 101.

Pulse Pressure: 61.

Palpitation: Marked on slight exercise.

Endocarditis: Positive. Myocarditis: Positive.

Pericarditis: Negative.

Intermittance: Positive. Murmurs: Aortic, regurgitation, mitral hammer.

Pulse: 96. Temperature: 97.8. Respiration: 18.

Urine: Glycosuria, negative. Albuminuria, slight trace.

Color: Amber. Reaction: acid. Specific Gravity: 1.028.

Tuberculosis: Negative. Syphilis: Negative.

Wasserman: Negative.

Operated November 19, 1920, removing pulpless teeth and curetting the sockets.

Case No. 2. Mrs. A. S. Upper right second bicuspid, rabbit No. 24.

Culture of tooth shows a small Gram positive Diplococcus. Rabbit inoculated with 3 c.c. of 36-hour growth on Dextrose. Necropsy, November 27, 1920.

Heart's blood culture shows Gram positive Diplococcus.

CHEST—

Normal in size and color. Vegetations on the auriculo-ventricular valve.

LUNGS—

Left has a mottled appearance, congested, and blood exudes on cut surface.

ABDOMEN—

Stomach and intestines normal.

Liver: Several small abscesses near gall bladder.

Spleen: Normal.

Pancreas: Normal.

Kidneys: Left normal in size and color. Capsule adherent. Many small hemorrhages on cut section. Few small abscesses near pelvis. Right: Grossly resembles the left except the lesions are not quite so marked.

Spinal Cord: Normal.

Joints: Normal.

Muscles: Normal.

Larger Nerves: Normal in gross appearance.

MICROSCOPIC EXAMINATION OF TISSUES—

One. Heart—Slight degeneration in the muscle fibers as shown by the pale staining nuclei of muscle cells.

Two. Lungs: Left shows an unresolved pneumonia in the stage of red hepatization.

Three. Liver: Abscess formation and connective tissue increase around the portal system due to amoebic infection.

Four. Kidneys: Marked polynuclear invasion of the glomeruli. White blood cells infiltrating between the straight tubules. Increase of connective tissue around Bowman's capsule and the walls of the blood vessels. Epithelium of tubules swollen and the nuclei stain faintly.

The most important lesions in this case are found in the kidneys. The changes in the lungs are possibly due to the weakened heart action.

Case No. 3. Mr. L. D., age 43, weight 174, normal.

Reported for examination and diagnosis on date of February 2, 1921.

DENTAL DIAGNOSIS

Faradic Test: All teeth responded to Faradic Test excepting upper right second molar.

Pulpless Teeth: Upper right second molar—no evidence of canal fillings—no rarefaction.

Gums: Slight degree of periodontaclasia.

PHYSICAL DIAGNOSIS

Tonsils: Out—crypts of fauces clean.

Pharynx: Negative.

Sinuses: Negative.

Glands: Negative.

Bowels: Regular.

Stomach: Negative.

Influenza: Negative. Pneumonia: Negative.

Malaise: Negative. Insomnia: Negative.

Psychopathy: Neurotic.

Arthritis: Negative. Arthritis Deformans: Negative.

Myositis: Negative.

Otology: Negative. Ophthalmology: Negative.

Cephalalgia: Negative.

Neuritis: Constant pain at base of thumb nail on right hand. Extreme pain in this region when hand becomes chilly. Carried thumb in grip of his fingers to protect from cold air.

HEART—

Blood Pressure: Systolic 132, Diastolic 102.

Pulse Pressure: 30.

Palpitation: Negative.

Endocarditis: Negative.

Myocarditis: Negative.

Pericarditis: Negative.

Intermittance: Negative. Murmurs: Negative.

Pulse: 80. Temperature: 98.6. Respiration: 20.

Urine: Glucosuria: Negative. Albuminuria: Negative.

Color: Amber. Reaction: Acid. Specific Gravity: 1,020.

Tuberculosis: Negative history.

Syphilis: Negative.

Wasserman Reaction: Negative upon three examinations.

Operated for surgical removal and curettage of socket of upper right second molar on date of February 12, 1921.

Case No. 3. L. D. Upper right second molar. Rabbit No. 28.

Culture of teeth shows *Streptococcus Viridins*.

Rabbit inoculated with 5 c.c. of 48-hour growth on Dextrose brain broth February 18, 1921.

Animal autopsied February 22, 1921.

Culture heart's blood shows *Streptococcus Viridins*.

CHEST—

Heart: Normal in size and color. Valves smooth.

Lungs: Normal.

ABDOMEN—

Stomach and Intestines: Normal.

Liver: Normal.

Kidneys: Normal in size and color. The right on cut section shows some areas of hyperemia.

Spleen: Normal.

Pancreas: Normal.

Sciatic nerve on left side shows small hemorrhages and oedema.

MICROSCOPIC EXAMINATION OF TISSUES—

One. Heart: No evidence of inflammation.

Two. Lungs: Right, alveoli are packed with white blood cells and the walls of same are thickened. Picture of second stage of pneumonia.

Three. Kidneys: Marked infiltration of entire structure of kidney with small round cells. Small areas of hemorrhage present.

Four. Right Sciatic Nerve: Normal.

Left Sciatic Nerve: The nerve fibrils stain faintly in some areas. In others they show a more marked degeneration. There is an increase of connective tissue around the fibrils. The myelin sheath is swollen and shows round cell infiltration.

This case presents a rather marked and infrequent neuritis, which we were unable to observe in other cases.

The series of twenty-eight inoculations were made, the bacteriological determinations and differentiations were recorded, the animal inoculations and the resultant sequellae were determined independently and without reference to the recorded history charts of the individual cases, therefore, Dr. Warvel made his records and findings without any knowledge of the condition of the patients.

The significance of the apparent elective localization of the pathogenic micro-organisms and their resultant lesions, corresponding to the anatomic lesions of the patients, seems to in a measure confirm the relation of dental foci to pathologic systemic sequellae.

On account of the length of the reports of the cases we have chosen to elaborate upon three cases only; however our detailed results of the other twenty-five studies conform to the cases herein reported, differing only in the physical conditions of the patients and the elective localization correspondingly.

We realize that this group of studies is not sufficiently extensive for ultimate and positive conclusions, but we expect to proceed with this investigation, and we anticipate the honor of a future presentation upon the subject, and hope to carry the work, just really begun, to a more logical conclusion.

The chemical evidence before operation upon each one of the twenty-eight patients under consideration and the fact that their clinical symp-

toms, postoperatively, were relieved, is further evidence in favor of our conclusions that these hosts were involved specifically by the bacteria, which unquestionably possessed specificity for certain of their tissues involved pathologically.

ADVERSE CONDITIONS MET WITH IN CONSTRUCTION OF THE LOWER DENTURE*

BY W. B. CALDWELL, D.D.S., HAMILTON, OHIO

THE FIRST STEP IN DENTURE construction is a thorough examination of the mouth. That we may be able to classify the case correctly, a digital examination is necessary, especially in the lower mouth, and the lower mouth is what I shall dwell on in particular.

It is not my intention to try to tell you how to construct artificial dentures, for this is a large field to cover and I would not get very far in the time allotted me tonight, but I shall endeavor to tell you how to eliminate some of the obstructions that tend to bother us very much in the construction of lower dentures.

In my dental experience of twenty-three years I think the lower mouth and the fitting of same has caused me more anguish and disappointment than any other one thing in dentistry up until about four years ago, when I assumed a rather pessimistic attitude, and considered the lower denture an absolute failure. There was no stability to them, and like Ivory soap, they floated.

Some four or five years ago the scene was changed, and the closed mouth, muscle-trimmed impression came in, and the success of the lower denture was established, and today we can boast of the fact that the lower is just as successful as the upper denture.

The fact of the matter is, when we have trouble it is usually with the upper case. The old technic of construction has caused us trouble in many ways, and one of the worst things it has done is the fact that it has so impressed the public mind with the idea that it is a very unsatisfactory appliance. We all hear this statement, and we hear it often "I do not want to lose my lower teeth because I will never get a set that will be satisfactory."

The people are not to blame for this state of affairs because it is true, or was true, and in fact is true today with the dentist who sticks to the old methods of denture construction. The proposition that the man is up against, who is using the latest technic, is educating his patients and trying to impress upon them that the lower denture is truly a success, and in many cases the old saying applies that "The

*Read before the Columbus City Dental Society.

proof of the pudding is in the eating." They will not believe it until they prove it themselves.

We have all made lower dentures in our dental experience that have proven highly successful. Why? Because the case was in Class 1. Everything was in its favor—a well-defined ridge, no resistive tissue attachments; but where we had one of this class, we had nine in the second and third class, which took the pleasure out of the first one.

I think I am safe in making this statement, that 75% of the lower mouths are not in any condition to construct a denture that will prove efficient, and 50% of them are not in condition to even attempt a fit; so I believe that we will all agree that we have failed in the past years on lower dentures. The dentist who thinks he has not, does not deserve to be on the earth. He should have a place higher up.

Why have we failed? Because we have tried to fit the condition as it existed, and we wondered why we could not. In the first place, we were afraid to cover enough surface to stabilize the plate. That was why the lower plate floated. The second and worst condition that we meet with, is the mylohyoid ridge. This is the point that I wish to discuss with you tonight.

In many cases, before extraction we find this ridge very prominent. After extraction, and resorption has taken place, the ridge becomes quite pronounced. It is next to impossible to construct a denture that can be worn with any degree of comfort. Naturally, the tissue attachments come up over the crest of this ridge, and being of a resistive nature, they will not allow the denture to ride, therefore the plate must be trimmed down until the lingual side is seated on the top of the ridge. The consequence is that the area below the ridge is lost entirely.

For years I have tried to fit these conditions mechanically, but to no avail. I was seemingly satisfied with my ignorance of these cases, gave them up and let them go elsewhere to be fitted, thinking all the time that it was my fault.

It was not my fault that I could not fit these conditions, because they cannot be successfully fitted, but it was my fault that I did not sooner recognize the condition, and correct it as I do now.

Three years ago I took up alveolotomy and have been using this method in the preparation of mouths exclusively; having numerous cases coming to me with mylohyoid obstructions, I decided there was just one way to overcome this trouble, and that was by surgical treatment. When we do an alveolotomy and find this ridge prominent, we reduce at the time of extraction, and then it will not trouble later on. Very often we have cases present where the molars have been gone for a long time. In these cases we often find a pronounced condition of the mylohyoid ridge, brought about by pressure, possibly from trying to masticate on the gums.

The old-method plate is responsible in many cases for this condition because it was not extensive enough in the lingual region. This con-

dition will arise even with the new plates, but not as frequent as with the old ones.

This mylohyoid operation is very simple. After thoroughly infiltrating the tissues with novocain, the overlying tissue is opened just over the crest of the ridge and the submucous membrane is dissected back as far as necessary, exposing the portion of bone we wish to remove. Having this part of the technic completed, we proceed to trim off the bony ridge. If there should be a thin spinous ridge, a rongeur or bone forceps may be used, following with a small medium grit carborundum stone to smooth the parts. In some cases we find this ridge thick and rounding. In this case a sharp surgical bur is a fine instrument for rapid removal of the bone tissue. After satisfying yourself that sufficient bone has been removed, cleanse the parts and draw the tissues together with a silk or 00 gut suture. Instruct the patient to use a mouth wash very hot and often if they should have much pain. In a very short time these cases are healed. Proceed to take your impression and build the case, and after it is inserted and worn a few days, it is certainly very gratifying to see the results. The patient has a perfect-fitting plate, a condition they never have enjoyed before, and one that will give the maximum of efficiency.

Another condition we frequently find is on the external oblique ridge; it is resistive tissue attachments which interfere greatly in stabilizing the denture, also lingually of the anterior ridge. These tissue attachments run very high. This condition can be improved by severing these attachments and relieving all muscular and resistive tissue strain.

I feel quite sure that some of you have had varied experiences with just such cases as I have referred to tonight. You have tried and failed, just as I did, and you wondered why.

Occasionally you will find a case with a decided undercut in the mylohyoid region, and the plate will be worn without irritation, because there are no resistive tissue attachments. These cases are in the minority.

I believe it is quite true that the majority of dentists in general practice do not care for denture work. They do it because they are almost compelled to, and certainly they cannot give the work the time and attention that is necessary to gain the best results. It is usually taken care of after a hard day at the chair, when the dentist should be relaxing and getting his rest. One should feel as full of pep when he sits down to coordinate a set of molar cusps as he does when he is inserting a foil filling, or any other operation.

Denture service to me is very interesting, and I think that this field of service is the largest and most important part. We have just begun, and prosthetic dentistry is just in its infancy.

When the dentist learns to prepare the mouth of his patient properly,

he overcomes the little adverse conditions that exist, and gets down to a definite technic. Just then he will commence to get the real enjoyment out of denture service.

MANDIBULAR TUMORS*

BY JOSEPH A. PETTIT, M.D., PORTLAND, ORE.

IF WE CONSIDER various kinds of dental cysts under the classification of mandibular tumors, there will be noted a relative infrequency of malignancy; and it is probable that the majority of the malignant tumors are not so in their early growth. More than in any other place in the body, the study of the etiology of tumors in the mouth has confirmed the chronic irritation theory—traumatic or bacterial. The normal tissue cells of the oral cavity possess an unusual degree of physiologic reproduction, as evinced by the regenerative power of the gum tissue, and by the healing of the other tissues with a minimum amount of cicatricial formation. Most of the tumors of the oral region can be traced to some continued bacterial or traumatic irritation. Cancer of the cheek is usually directly traceable to rough or irregular teeth. The epulis develops at the site of an extraction. The lesions, once developed, are usually subjected to a continued chronic irritation; and this may give some reason for the malignant changes which occur in the early benign types.

It is to be noted that, when the malignancy occurs, it is frequently of the rapidly growing type, excepting in the epulides and some of the giant cell sarcomas. Various reasons are advanced for this rapidity of growth; but there must yet remain some doubt as to the true reason. It is not improbable to assume that neoplastic reactions in normal tissue are not dissimilar, from a pathologic standpoint, to an inflammatory reaction, so far as the normal reaction of the fibrous tissue cells endeavors to arrest the abnormal cell proliferation, on the one hand, as it does the bacterial proliferation, on the other hand. The result may vary somewhat in accordance with the relative powers of the two processes. It is not unreasonable to assume that the benign tumor is thoroughly encapsulated, not alone because of its own special type of cell, but also because of the relative greater ability of the normal physiologic process to throw out a successful capsulation. The slow growing scirrhus carcinoma is recognized as such because of the large amount of fibrous tissue, rather than because of a special type of carcinoma cell. The giant cell sarcoma probably represents a fibrous inhibition of rapid karyokinesis over the small, round cell sarcoma. The theory would perhaps be more applicable to the primary neoplastic lesions than to the metastatic lesions, as it is probable that, when a so-called "strain" in the malignancy

*Read, 1921, before the Section on Stomatology (A. M. A.) of which, by special arrangement, THE DENTAL SUMMARY is the representative organ for the dental profession.

cell is developed, it carries its proclivities to other parts, with the body in a state of lessened "resistance."

We have all learned to respect the virulence of the small, round cell sarcoma and the carcinoma when once established in the mandible. The ultimate mortality of such cases has been appalling. These tumors, frequently benign at first, are not often subjected to an early consideration by a competent oral surgeon, and it is probable that the early malignant life may be of short duration. Early radical treatment is at times delayed by a desire to avoid disfigurement.

The type of tumor called epulis, while essentially malignant, is governed by restrictions which make it amenable to surgical treatment. It is unfortunate that not all malignancies are subject to the restrictions, during their early growth, which govern the epulis tumor. Pathologically, it is not infrequently confused with the giant cell sarcoma. The growth is exceedingly slow, and it spreads only by continuity of tissue. It should, when diagnosed early and when properly treated, always yield a cure. It is noted by clinical observation that with each recurrence its virulence increases, and a successful eradication is rendered more difficult. Its location of origin always points to a cause of chronic irritation. Early treatment of epulis growths occurs as a rule in the dental chair, and the oral surgeon usually sees them after second or third ineffectual removal. It is here as well as in the other malignancies that the heat treatment has a potential influence—either alone or in connection with a surgical excision.

The epuliades can distinctly be classified as oral lesions, and their early characteristics should be more thoroughly taught to dental students. The appearance of an epulis is generally antedated by the removal of the diseased tooth. The growth at first has all the appearance of an innocent excrescence protruding through the aperture in the gum formerly occupied by a tooth.

The base may spring from the fibrous tissue, or it may spring from the myeloid tissue inside the alveolar process. The possessor of an epulis usually returns to the dentist who extracted the tooth, and he in turn with ease and facility clips off the growth. This may be done a second or third time within the succeeding months. During this period the virulence of the neoplasm apparently increases, and the oral surgeon, when consulted, finds it necessary to pursue a rather radical procedure.

The proclivity of the epulis for extension by continuity of tissue only is well demonstrated by one case which ultimately came to the clinic of the North Pacific College. During the preceding six months, this man had had successive dental procedures without a microscopic diagnosis. The teeth on one side were gradually removed, the antrum was being irrigated, and the entire submucous space of the hard palate was being cleansed of pus and successively loosened pieces of necrosed bone. A radical removal of the superior maxillary on this side gave an apparent cure for several months. Excision and heat were used jointly. Local recurrence necessitated the

removal of the nasal bones, the lateral walls of the orbital cavity and the eyeball, resulting in a temporary cure. Some months later, a local recurrence necessitated the removal of the malar bone and contiguous tissues. The virulence was so well established, however, that death ensued about four months later from extensive local recurrence. No metastasis at any time occurred, and never was there any glandular involvement of the cervical lymphatics.

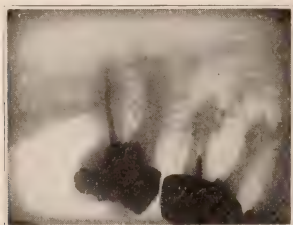


Fig. 1

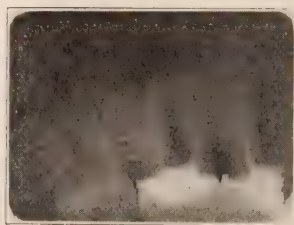


Fig. 2

Fig. 1.—Suppuration at root of molar: drainage by removal of portion of external alveolar plate with resultant preservation of tooth.

Fig. 2.—Same condition as in Figure 1: patient treated in similar manner with equally good result.

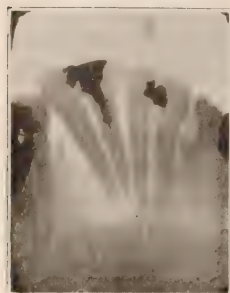


Fig. 3

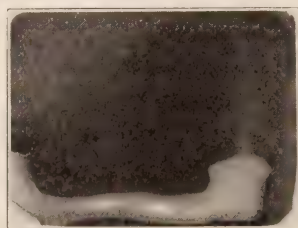


Fig. 4

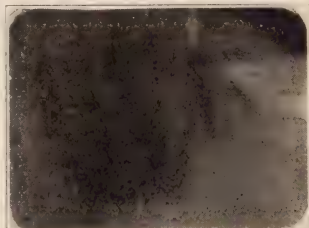


Fig. 5

Fig. 3.—Bone cyst at root of incisors: incision made and part of external alveolar plate removed with preservation of teeth.

Fig. 4.—Large cyst at base of bridge support: cyst and lining shelled out with preservation of support.

Fig. 5.—Cyst at root of incisors. similar operation as in Figure 4, with preservation of all four teeth.

It is noted that few dentists send to a pathologic laboratory excrescences which they remove from the oral cavity. Every excrescence represents an abnormal cell proliferation, which places it in the classification of the neoplasms. In the teaching of dental students, the importance of this point should be thoroughly impressed on the mind of each graduate.

It has been interesting to note the various diagnoses which come back from different pathologists, whose opinion is sought on an epulis section. Those who have examined a number of specimens, however, and have had the advantage of knowing the clinical course of these cases, will not send back a report of a benign fibrous tumor of no definite characteristics, for the

diagnosis of giant cell sarcoma. The giant cells are frequently in the sections, but the picture is characteristic to the experienced eye.

Despite the confusing pathologic picture, the epulis must be considered as essentially malignant, belonging to the mesoblastic type of neoplasms, just as much so as the so-called rodent ulcer is a similar type of malignancy of epiblastic structure.



Fig. 6

Fig. 6.—Osteoma: conservative operation without sacrifice of teeth.

The general tumors, both benign and malignant, which affect the mandible are so thoroughly understood (pursuing a similar course in other parts of the body) that it is not logical to impose on this meeting a summary of this part of our subject. The treatment of these tumors is so well standardized, and the principles so thoroughly understood, that it is hardly logical to give any consideration to these principles, excepting so far as especially to emphasize the importance of early radical treatment of malignant types when they are in the mandible. We must recognize the well known virulence when here situated, and the early metastasis which takes place in a region well supplied with lymphatics.

The malignancy of the fundus of the uterus remains a local lesion for a greater length of time than when it occurs in the cervix. It is a general rule that metastasis occurs earlier from any malignancy at the outlet of the urinary bladder or the gall bladder than from the fundus. Apparently, in the oral cavity there is no fundus nor outlet to consider; and early metastasis finds a limitation only when the type of malignancy is of the slow growing type. Tumors of the mandible can usually be noted early in their existence on account of the superficial location of the bone; whereas in the abdominal cavity, or in some deeply situated bone, as the femur, a tumor must attain some proportion before attention is directed to it, and in case the tumor is of malignant nature, the possibility of an early eradication is lost. It is probable that the high percentage of cures of cancer of the lip

depends more on this fact than on the fact that malignancy is less virulent in the lip than elsewhere. The use of heat and radium has apparently increased the percentage of cures of malignancies of the mandible, as evidenced by the experience of Ochsner, New and others; and our own observations have been in accord with this fact. Probably when this technic is more standardized by a longer experience, we shall note that the results are even better.

Of especial interest in connection with mandibular tumors are dental cysts. These are of two general types: (1) those which arise from some embryonal rests, and (2) those which have an origin from a preceding infection. The first type reproduces a type of tissue analogous to some true dental tissue. The second type develops a type of cyst containing fluid or tissue usually encapsulated and not resembling any type of dental tissue. A growth of the second class of cysts is usually more progressive, and gradually involves and destroys a larger amount of mandibular structure. Study of the inflammatory cysts is rather illuminating on the pathogenesis of tumors in general. The primary infection at the root of the tooth soon becomes historical. The proliferation of the granulomatous tissue is kept pace with by the epithelial proliferation, which at once surrounds and penetrates the granuloma. If apical tooth infection can produce a neoplastic process, is it not logical to assume that the stomach ulcer, the ulceration of an old cervical laceration, or the bacterial or traumatic irritation of any tissue will stimulate a cellular proliferation that will go beyond the limits of normal physiologic repair and become neoplastic?

It is especially desired to discuss the inflammatory dental cysts from a standpoint of treatment in reference to the conservation of teeth. There are many cases in which this type of dental cyst, while originating from a tooth infection, does not in any wise involve the tooth after the primary infection becomes historical, and the proliferating cyst has formed.

On account of the relative density of the bone, these cysts usually impinge on the outer surface of the mandible, and are more readily accessible to surgical drainage. Many of these cysts can be opened up and their contents removed, as well as the capsule and the area packed and healed, without sacrificing any of the teeth. In this type of case, we are dealing with a neoplastic disease which stands out by itself, having been stimulated to growth by the original apical infection. This apical infection in such cases is healed and cured; if not, the tooth would have presented the characteristics of the so-called ulcerated tooth.

The application of this principle is analogous to general surgical treatment of bone cysts and bone infections elsewhere. This idea is advanced with a full realization that strenuous criticism will be provoked. Nevertheless, clinical application of this principle, during the last few years has yielded results that have been equally as satisfactory as any other line of treatment, and at the same time has resulted in the conservation of many teeth.

The general surgical principles of bone infection have not been fully applied to the treatment of mandibular cysts and mandibular infections, especially those originating in dental lesions. It is desired to advance the idea that the first thought in such situations should not be a necessity to resort to promiscuous extractions.

The area from which a dental cyst or a granuloma has been removed is filled up by normal cicatricial tissue, either fibrous or osseous. When bone cysts are removed from any of the long bones, we find this basic principle very dependable. When either of these processes occur in the mandible, there may be exposed, on removal of the disease area, some part of a tooth, otherwise solid and painless. The fact of this temporary exposure should not always condemn a tooth and warrant its extraction. The tooth is at this time not a part of the process but simply a contiguous neighbor, so to speak. The new tissue which forms, fibrous or osseous, will frequently form an adequate protection. The infection which once existed there and originally started neoplastic process is historical. An uninfected, solid, devitalized tooth can serve a useful purpose, and is not necessarily a menace. In several cases of this particular condition there was temporary exposure. The healing in the area furnished an adequate protection for these particular teeth; and since then they have been firm, solid and useful. In two cases of cysts which produced a sinus instead of continuing to increase in size, the treatment was satisfactory and the teeth were conserved.

American dentists should take
notice that Krupps in Ger-
many is turning out gold teeth
made of steel.

WHAT DENTISTRY HAS DONE FOR MEDICINE*

BY J. A. WITHERSPOON, M. D., NASHVILLE, TENN.

I REGARD THE MEMBERS of the dental profession as real life-savers. When I first entered the practice of medicine I believed that dentistry was a worthy branch of medicine, and that you were a part of the great life saving crew that had entered the work for the benefit of humanity. Some of the most able men in your profession at that time resented the statement that you were specialists in medicine. As scientific acumen grew and as the great book of scientific investigation gradually opened, it was shown that you were worthy sons of the great general profession of medicine, and you have done wonderful work in helping us to prevent the fell destroyers of humanity, viz.: infective bacteria focalizing, and by distribution through the blood or lymph channels producing diseases.

I want to congratulate the dental profession of Nashville for its unity of thought and brotherhood. The time has passed when men bicker with professional jealousies, and we here are working together for the benefit of mankind.

Those of you who have studied in Europe must realize that America is the father and mother of true dentistry. You find there all sorts of fine work along scientific lines, all kinds of pathological and clinical differentiation work, but in dental work they are far behind us. It made me proud of my country and proud of your specialty. American dentists have been pioneers along all lines and they have made possible the great development of preventive dentistry that has come during the past thirty years.

When I first took up the study of the focal infections, I was astonished to find what a part dentistry had to play. The mouth is the pivotal point upon which must be built the vitality of the individual. Many do not realize how many general constitutional diseases are fomented, developed and come from dental infections. The mouth is filled with a heterogeneous mass of bacteria, putrefactive and otherwise. The tendency to use coarse tooth brushes, and sharp toothpicks along the delicate gum tissues is tremendously bad, because it opens up places through which infection goes, niduses are formed and the field for absorption made ready. If the germs remain local, they cause Riggs disease and possibly an abscess; but often from there they go directly into the vessels and to the heart, and endocarditis, pericarditis, myocarditis, nephritis and arthritis are produced from the absorption of germs from the mouth. I saw a case today. The man's mouth contained wonderful dental work, but it was one of the worst mouths I have seen. We must all go together as a part of this great life-saving crew. I always want X-ray pictures to assist in diagnosis.

*Stenographic report of a talk before the Tennessee State Dental Society, 1921.

We must be conservative in our work also. Because a man has pyorrhea is no reason why you should pull out all his teeth. You will never make as good a tooth as the Almighty made. If you have a pyorrhetic, there is usually a constitutional condition behind it. Some teeth should be removed without doubt, but I beg of you to remember that the mouth is but a small part of the human body. Do not look upon your profession as being all of human life. You are simply one of the important entities, but you do cover the field where there are more infections that destroy human life than any other.

In your work mere esthetics should not govern. It is not whether Mrs. So-and-So has a beautiful set of teeth, but whether she has a normal heart that counts. If you find pus at the apex of the tooth, that constitutes a menace to the health of the patient. You are not alone artists, but you are scientists. You are not alone interested in the beauty of your work, but you are the protectors of human life. I would rather have an edentulous space here and there to be filled by your wonderful restorative work than to have a nidus in existence producing its disastrous effects. All honor to you for the work you are doing for the people of America in connection with the protection of their children along dental lines. Let us work toward keeping the teeth in sound condition, so that they will not need to be extracted. If the present rate of extraction continues, it sometimes seems to me we shall soon be an edentulous race, just as in the next fifty years, if we do not watch out, we won't have a child born with a tonsil. The proper dentition of childhood makes for the proper assimilation of the food and for healthy manhood. If you meet squarely the solution of the many problems and the duties that confront you, I want to say again you are worthy sons of general medicine, and I say God speed; you are an honor to your profession and an benefactors to mankind.

CAST GOLD AND ALUMINUM BASES, USING THE
MORE PLATE-FLASK

BY GUY T. KATNER, D.D.S., TOLEDO, OHIO

THIS IS WRITTEN in the hope that those interested may find, in the methods described, some hints and suggestions tending to shorten the casting operation, and add to the definiteness and certainty of results.

No originality in the methods recommended is claimed; and I wish to avail myself of this opportunity to express my gratitude to the many able workers and writers who have contributed to the making of better dentures than was possible under older methods.

In describing the different steps in detail, which is essential in a paper of this character in order that the reader may duplicate the process, one must necessarily mention many things that are well known to many and often emphasized in writing; therefore the reader will kindly bear with the writer in recalling such points as may be entirely familiar to him.

The impression, if any part of it is of plaster, should be painted with a coat of thin shellac, followed, when dry, with a coat of sandarac varnish. When the varnish becomes dry, immerse the impression in water in order to fill the pores, which will prevent the absorption of water from the material used for the model or cast. It is well to blow off any surplus water that may remain on the impression before endeavoring to pour the cast, since any free water on the impression will thin out the material forming the cast, and cause a weak or soft spot. A modelling-compound impression may be used without varnish, and it is unnecessary to place such an impression in water.

The model (or cast) should be made from some one of the artificial stones. Those that are finely ground will yield a cast with a dense and smooth surface, and one that is not easily affected by water, handling, or the adapting of the wax. Surround the impression with boxing-wax to a height of at least one inch above the edge, to obtain sufficient thickness for swaging.

The mix of the stone is quite important, for the strength of the cast is greatly affected by the amount of water incorporated with the powder. In models for this work the maximum strength is required, since it is necessary to swage the cast plate to counteract the shrinkage of the metal during the process of casting.

The first part of the mix is carried forward about as in mixing plaster, spatulating the mass thoroughly until the water and powder are completely incorporated. Continue adding powder and spatulating until the mass becomes too dry to be handled with the spatula, when it should be taken from the bowl and kneaded in the hands. More powder may then be

added by placing the mass in the powder and again kneading, repeating until the correct consistency is attained. This is a very smooth, stiff mix, not pliable, and will break apart readily; yet when placed in the impression and jarred down by tapping on the bottom of an inverted plaster bowl it becomes very mobile, and settles to place without difficulty. (*See foot note*) The jarring should not be continued long, since the surface next the impression soon becomes smooth, and the bubbles that rise into the mass of the cast are so few that the strength of the material is not greatly decreased by their presence.

The resultant cast may be removed from the impression at the end of about two hours, and any necessary carving should be done at that time. The cast should then be allowed to stand exposed to the air for one hour, when it should be placed in warm water, about 98° F. The laboratory wash-bowl is very convenient for this purpose, for, by allowing a small stream of hot water to flow over the cast, the temperature is held constant. The placing of the cast in warm water allows it to take up sufficient moisture to prevent the wax sticking to it. It also raises the temperature of the cast, which facilitates the adaptation of the wax. Water at the temperature recommended, when imparted to the cast, does not soften the wax, except in the cooler weather; but it does improve its workability. I have been using the R. & R. special base-plate wax, but there may be others that will work at about the same temperature.

Crumple up several sheets of tissue-paper and form them into a roll about one inch in diameter and two inches long. Two of these rolls should be made and placed in water. Now, the wax, 30-gauge, is dipped in the warm water and placed on the cast, we will say, for an upper denture, and very lightly carried down into the vault at the posterior extremity of the cast. This results in but one bend of the wax, the posterior part lightly touching the posterior vault from heel to heel, the anterior part of the bend touching at the lingual curve of the ridge from the heels to the anterior median line.

Place one of these tissue rolls in this bend of the wax and while holding the wax in place with one thumb press down on the paper into the posterior quarter-inch of the vault with the other. Retain this with the thumb to hold in place and with the other thumb and finger press the paper roll together away from the sides of the vault and force it into the vault; then flatten out with the thumb.

The tissue holds the warm water, which aids the flowing of the wax. The water also softens the paper, and makes it an ideal swaging material for the wax. The use of tissue paper in this manner will



Note—A very convenient and entirely satisfactory "jogger" may be made easily from the hub of a brush-wheel and screwed onto the mandrel of a lathe. When the impression has been filled, place it on a sheet of tin or anything of that nature, and hold the tin gently against the surface of the rotating "jogger."

adapt the wax to the vault, and over the remainder without undue thinning or tearing. Hold this roll in the vault with the thumb while continuing the adaptation. This will insure that there shall be no movement or "creeping" in this section.

The wax is now cut in the part that extends beyond the ridge, at the median line, forward to the edge. This allows the two sides to be adapted separately. If there is a depression on the ridge between the cuspid and tuberosity, it is best to grasp the wax gently between the thumb and finger, and lay it down over the ridge by rolling the thumb. This prevents a fold. The tissue is again used, and the adaptation completed on the one side.

The wax projecting beyond the median line and frenum should be cut away, and the wet paper rubbed gently over the cut edges. The edge is thereby burnished to a knife-edge, which will join with the other side as it is brought to place without a noticeable joint. This burnishing effect of the tissue-paper roll is well worthy of attention, since, by its use in adapting, the wax is drawn thin. The paper is best handled by pressing at right angles to the wax, or in a rolling manner. When the wax has been completely adapted it can be polished very nicely by taking advantage of the burnishing effect of the tissue-paper, as mentioned. This is done by lightly stroking or rubbing the wax with the roll of damp tissue paper.

The wax pattern now becomes a matter of individuality, necessity, and the requirements of each particular case; therefore I shall not attempt to say how it should be completed. The undercuts for the vulcanite may be made deep or shallow and vulcanite attachments made to suit the ideas of the operator. I generally use about a one-sixteenth inch strip of twenty-gauge wax for the lingual undercut, pressing it lightly onto the pattern, and then sealing it with the hot spatula. By allowing this to cool and then going over it with a spatula warmed just enough to burnish, the joint is improved, and the undercut shaped as may be desired. (*Fig. 1*)

There are many ways of making attachment pieces for the Vulcanite. I find a piece of wax in zig-zag form, called a "Vulcanite Attachment," very good for this purpose. It may be applied on the points, making loops, or laid down and then burnished down into over-hanging edges, forming under-cuts, as the case may require. (*Fig. 2*). All of this work is facilitated by using one of the low-power electric-light bulbs. The heat from such a source, thrown onto the pattern, keeps the wax in a workable condition. After all attachments are placed, the excess wax is trimmed away.

The pattern is now ready for attaching the sprue and investing. It is well to remove the pattern from the cast at this time, in an experimental way, since it gives us the assurance of its coming away later when we wish it. This is best accomplished by placing cast with wax pattern up in the bowl; stop the flow of warm water and allow to remain for few

minutes. Its removal may be facilitated by using a water syringe and playing a stream against the edge of the pattern. If there are undercuts, bend the wax out of them before attempting to remove the pattern. When the wax pattern comes away from the cast, replace it and gently readapt to the cast, except in the undercuts. Now attach the sprue at the anterior junction of the lingual waxed undercut. The sprue is a strip of twenty-gauge base-plate wax, about five-sixteenths inches wide. This supplies a sprue that will pass readily through the clay crucible when investing, and carries enough volume without the danger of the sagging of the metal. The sprue should be attached at an angle of forty-five degrees to the general level of the ridge, and pass backward over the vault. At a point three-quarter inches back from the place of attachment to the pattern, bend the sprue upward, perpendicular to the ridge, and the pattern is ready to invest. (*Fig. 3*).

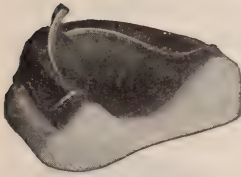


Fig. 1



Fig. 2



Fig. 3

The production of a smooth surface on the casting is very desirable, and I find that this may be accomplished by the use of a painting investment compound put up by The Ransom & Randolph Co. This material is prepared for use by shaking the powder into water, allowing the water to take up the powder without stirring or spatulating. The proper consistency for the thin part of the mix is obtained by allowing a small portion of the water to remain unabsorbed at the edges of the mix. The mix may be prepared very handily on a watch-glass. For inlays a cement slab may be used, since only three to five drops of water are required.

The painting of wax patterns with a water-mixed investment has been a rather difficult thing to accomplish, because of the incompatibility of the water and wax. This, however, is obviated very pleasingly by the use of alcohol sprayed upon the wax pattern with an atomizer before attempting to paint. The alcohol wets the pattern, has an affinity for the water in the mixed investment, and carries the investment with it. The thinner part of the mix is applied with a brush, and then blown down with a chip-blower. There need be no care taken in its application, except to see that the pattern is entirely covered. This results in a film coating covering the pattern, which is immediately covered by the thicker portion of the remainder of the mix, completely concealing the wax. (*Fig. 4*).

Each of the steps given is a preparation for the succeeding step; therefore, do not allow the alcohol to dry. Simply shake off the excess before applying the thin part of the mix. The film should be almost immediately followed by the thicker portion. This covering of painting investment is allowed to dry for about one minute, until it becomes a dull white, when it is covered by about an eighth-inch layer of Standard investment, to give sufficient strength for handling. A little of the Standard may be mixed the same as the painting investment, to a thick, creamy consistency. This will not flow readily, but is pliable, and may be pushed about with a brush. The Standard investment will harden in about eight minutes, when the pattern may be removed from the cast (or model), and the painting investment, followed by the coat of Standard, also applied to the palatal surface in the manner just described, carrying the coating of Standard over the edges of the pattern, connecting it with the layer of Standard first applied, as directed. (*Fig 5*). When this has hardened, the wax pattern is surrounded by a double envelope of investment which protects it from distortion during the process of investing it in the flask. The painting investment is very fine, which gives a beautifully smooth surface to the plate cast against it, making only the minimum amount of polishing necessary.



Fig. 4

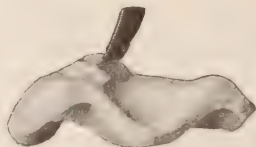


Fig. 5



Fig. 6

When the envelope has become hard, immerse the whole in water, together with a clay crucible. This is done for the same reason that we wet an impression before pouring a cast.

Sufficient Standard investment compound to complete the investing of the case is now mixed to a stiff-cream consistency in a large plaster-bowl. The inner perforated flask is placed in the outer cast-iron flask, and filled nearly full of the mixed investment. The invested pattern is now taken from the water, the palatal surface filled with the mixed investment, turned over and forced down into the filled flask until it is below the level of the top edge of the inner flask. The flask is then filled with the remaining mix to about an eighth inch above the top of the outer flask, and the cover placed in position, centering the sprue, and forced down. (*Fig. 6*).

The clay crucible is now passed over the projecting wax sprue, and rotated with the thumbs, as it is pressed down to position, the fingers

pressing the flask-cover down, at the same time, until the grinding of the investment between the cover and flask can be heard. Hold in position for 3 to 5 seconds then trim away the surplus investment material. (Fig. 7).

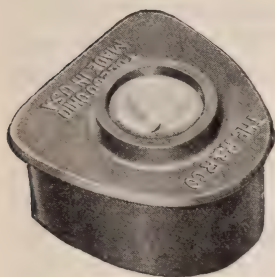


Fig. 7

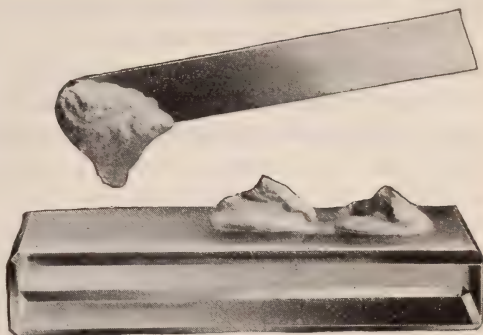


Fig. 8

When using the flask on a pressure casting appliance, force the clay crucible about an eighth inch below the ring of metal to obtain ample space below the plunger-cover.

It may be well to speak of the correct mix of Standard investment at this time. When *and if* properly mixed, Standard investment will not shrink. If shrinkage appears, it is solely and entirely because the mix has been made too thin. In the thin mix the particles of the investment are held apart by the excess water. When this is driven off by heat, the spaces it occupies close up, causing the shrinkage. If the mix is carried to the consistency of very stiff cream, as before mentioned, the correct amount of water will be incorporated, and, chemically speaking, Standard investment will be the result—not Standard investment *and* water; and the application of heat will have the effect intended—that of a slight expansion of the investment.

Be sure that the investment is mixed as directed, so that it will hang and drop from the spatula and form masses as shown in Fig. 8.

Standard investment reaches its maximum expansion in the chemical process of setting by the end of the first hour. It may therefore be allowed to stand any length of time thereafter without injury to the mold. Theoretically, by applying heat before the end of the first hour, we are adding heat to that already generated by the chemical process of setting, and thereby increasing the normal expansion of the investment.

The heating or drying-out of the flask should be conducted very slowly and considerably. During the first fifteen minutes the heat should not exceed 300° or 400° F. At the end of that time it may be gradually raised to about 700°, where it should remain until the flask and invested case are entirely dry, when it should be raised as rapidly as possible to about 1400°, and held there twenty to thirty minutes, or until a bright cherry red may be seen by looking down through the sprue opening. This is about the color

of your neighbor's cigar when he is smoking gently. The dull cherry is too cold, and the white heat is too hot. In either case a failure is likely to follow an attempt to cast. If every step is carefully and correctly taken, failure will be almost impossible.

When the flask has attained this heat, clean the gold to be used on a charcoal block. Then take the flask from the furnace, rub the bottom ring on an asbestos board to clean it, and set it in place on the Elgin bed-plate. To be sure of an air-tight connection, rotate the flask back and forth on the bedplate until a vibration is felt. Rotate gently, not violently, for the flask is very dry, and the mold may be injured by rough handling. As soon as vibration is felt, turn the flask very slightly backward—in the opposite direction to that in which it was moving when vibration is felt—and release it. An air-tight seal between the flask and bed-plate may be depended upon. If vibration is not felt, remove the flask and rub the bottom of it gently on a piece of very fine emery-paper, and try again.

By this time the cleaned gold will have cooled to a cherry-red, when it may be picked up with pliers and placed upon the clay crucible in the top of the flask. Play the blow-pipe flame upon the nugget until it reaches the proper molten state, and make the cast. Keep the flame playing on the button until the casting has had time to solidify. By keeping the residue of gold in the crucible in the molten state until the casting has congealed to some extent, the draw caused by the shrinking of the metal is downward. If the flame is removed from the bottom as soon as the casting is made, the button will cool first, since it is in contact with much cooler atmosphere, and the draw will be upward, toward the button, and might even extend to the casting and pull away a part of it.

There are two good ways of handling the plate at this stage. The flask may be allowed to cool, when the plate may be removed. If trial on the model indicates swaging to be necessary, the plate is annealed, swaged, and then retempered by heating to a dull cherry and allowed to cool very slowly.

The other method is to open the flask at once, cut the sprue while the plate is still cherry red, plunge the plate into water, at once annealing it. The plate is then tested and swaged if necessary, and the plate retempered.

The flask may be opened by inverting it and tapping smartly on different sides of the outer flask. This breaks the seal of investment above the inner flask and the outer comes away. Draw the pin holding the joint of inner flask together, and force apart with a plaster knife. (*Fig. 9*). The investment may now be broken away from the casting. Expose the sprue by removing remaining investment and cut the casting free. Clean the investment away from the crucible, and tap it out of the cover. If the crucible is whole, it may be used again. If broken, save the pieces, as they may contain some gold, and send them to the re-

finery with other scrap. The button may be removed by tapping on the cut sprue.

All of the foregoing has had to do with casting in gold. The aluminum base-plate may also be cast in practically the same manner, with a few changes in technic, as follows:

In the preparation of the wax pattern, an eighteen or twenty gauge base-plate wax is advisable. The sprue should be double, or twice the thickness of that for gold, two strips of twenty-gauge wax being used.

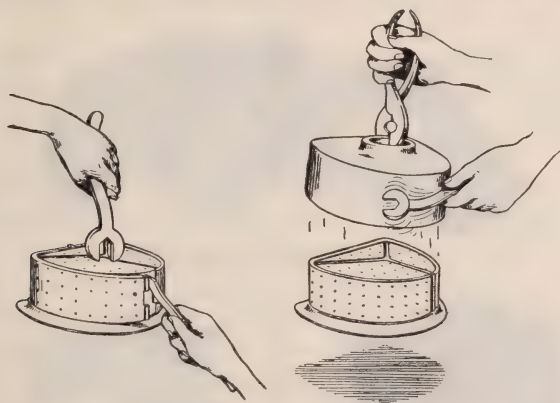


Fig. 9

The drying-out of the flask and the heating up may be done on a Bunsen or a Fisher burner, using about an inch and a half flame for the first fifteen minutes. The flask is placed above the burner in such position as to allow the upper half of the flame to enter the bottom opening. At the end of fifteen minutes, the flame is raised to about three and a half inches, and allowed to remain at that until the flask is dry. Then give it a full flame, of seven or eight inches until the flask stops smoking when the flame is turned down to the height first used and allowed to remain at that point for another half hour, when the flask is ready for the next step.

Place the dry flask on the bed-plate and test the seal as for gold-casting. Place one-third to one-half ingot of aluminum in the crucible, A large brush-flame from the blowpipe is played upon the metal until it flattens out. Test it with some old instrument, such as a spoon excavator, by stirring it about. A feeling of resistance indicates that the metal is not yet fully molten. Continue playing the flame and testing until the resistance disappears, and then cast. The molten metal will not pass the color of bright aluminum in the daylight. By testing the condition of the molten aluminum in the manner suggested, metal will not become overheated, and the result will be a bright, clean base-plate, having the smooth characteristic feeling of aluminum.

It is well perhaps to describe to some extent the Moore Plate and Saddle Flasks and Inlay Rings. These flasks without a doubt are among

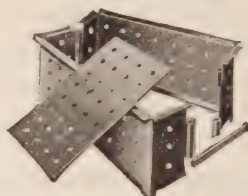
the greatest improvements that have come to casting in the last few years. They are so constructed that there is a space surrounding the investment on all sides except the top. This is accomplished by using an inner perforated flask somewhat smaller than the outer flask, and with an outward-turned upper edge which prevents investment from passing downward into the space between the flasks. This space provides a lateral emptying of the air in the mold. It therefore gives us the ability to cast "up hill." If metal may be made to flow up hill, it therefore can be cast "down hill" with an increased efficiency. The space is a great



Fig. 10. The Moore Plate Flask.



Outer Flask



Inner Flask

Fig. 11. The Moore Saddle Flask.



Fig. 12. The Moore Inlay Ring.

aid in eliminating the moisture as the flask is raised so it does not rest on the base. It also acts as an equalizer of the heat and as an insulator against the cooling of the atmosphere when the flask is placed on the casting.

The inner flask is provided with hinges having loose pins which enable one to remove the flask from the investment without the necessity of plunging it in water or cutting it out with a knife. (*Figs. 10, 11 and 12*)

REPORT OF DIRECTOR OF THE BUREAU OF ORAL HYGIENE,
TENNESSEE STATE BOARD OF HEALTH *

BY A. G. BUCKNER, D.D.S., NASHVILLE, TENN.

*To His Excellency, A. A. Taylor, Governor of Tennessee, and to the
Tennessee State Dental Association.*

Gentlemen:

Pursuant to, and in compliance with, Section four of Senate Bill 649, Chapter 172, of the Acts of 1919, I have the honor, as Assistant Secretary of the State Board of Health and Director of the Bureau of Oral Hygiene, to submit herewith my third annual report.

You will recall that at the time of your last annual meeting negotiations were in progress between the State Board of Health and the United States Public Health Service whereby a Mouth Hygiene Unit was to be assigned to Tennessee for work in connection with this Bureau.

Work with this Unit, consisting of two people, Major Butler and Miss Thornhill, was begun about October 11th at Johnson City. A ten days' educational campaign was conducted in the schools of that city. The High School and four elementary schools were visited, as was also the East Tennessee State Normal. Several hundred children were examined and their mouths charted. At the conclusion of the campaign the City Board of Education agreed to provide \$2,400.00 per year to employ a hygienist to work in connection with the school nurse and to have charge of the dental clinic, which is centrally located in the High School building. This clinic is splendidly equipped, having a modern dental chair and cabinet, as well as an electric engine and sterilizer.

Greeneville was the next place visited, one week being spent here in educational work. The Parent-Teacher Association was deeply impressed and enthusiastic concerning the possibilities of a dental clinic and it is believed that something permanent will eventually result from the work done here.

At Morristown, the next city visited, some preliminary work had been done by the dental profession and the county nurse, so that it was comparatively easy to promote a successful campaign. Here the Junior Red Cross agreed to finance the proposition for the first year and by a tacit agreement the City Board of Education is to assume the responsibility at the expiration of this time.

In Knoxville, where two weeks were spent, it was found that a voluntary clinic was being conducted in connection with the Health Center, where a very good equipment is installed. The campaign in this city, from an educational standpoint, was eminently successful and the Board of Educa-

*Read before the Tennessee State Dental Association, May, 1921

tion was so impressed that they assured us that as soon as their budget would permit they would employ as least one dentist or hygienist to have charge of a definite mouth hygiene program.

From Knoxville the Unit proceeded to Maryville. The stay here was somewhat disappointing, due to several reasons, chief of which possibly was the severely inclement weather; however, it is believed that the time spent here was not altogether wasted and that some good will eventually come of it.

At Cleveland we found a splendid field in which to work, a great deal of constructive work having previously been done by the physicians, dentists and school teachers of that city and county. The school children of Cleveland are provided with toothbrushes and a daily toothbrush drill is practiced. Dr. Swartz, a dentist of this city, is deeply interested in the work and is devoting Saturday gratis to prophylactic work for children who are unable to pay for such service. We were assured by the Parent-Teacher Association, and other organizations, that they would eventually undertake this work on a substantial basis. A fund is being raised to finance the proposition.

Two weeks were given Chattanooga, where we had the earnest cooperation of the dental profession, the Commissioner of Health and Education, the Junior Red Cross and the entire teaching corps of the city and, as a result, a permanent clinic, financed jointly by the City Health Department and the Junior Red Cross, was established. \$2,500.00 salary is provided for the clinician who has been employed.

From Chattanooga the Unit was moved to Columbia, where a week was spent in the schools of that city. Three days were also given to Mt. Pleasant. It is believed, from reports since received from Maury County, that the dentists and other interested citizens of that county, stimulated by the work of the Unit, will succeed in establishing some kind of a county clinic.

Immediately following the Christmas holidays a two weeks' campaign was put on in Nashville. One week was spent at Clemons and one week at Warner Schools. While no tangible results followed the work done here, it is believed that the time and labor spent will eventually bear fruit.

A week was spent at Jackson, where we were cordially received by the public health authorities, Rotary and Kiwanis Clubs, as well as the public school teachers. A mistake was made in not allotting more time to this city and it is hoped that we shall be able to give it additional time before the Unit is recalled from the state. The possibilities here, I think, are very flattering.

Possibly the best work accomplished was at Memphis, where, with the earnest support of the local dentists and Professor Wharten Jones, Superintendent of City Schools, the city government, through its health department, appropriated a sufficient sum to maintain two units consisting of a dentist and a nurse or a hygienist and a nurse each in the schools of that city, beginning with the next school term. The Red Cross

agreed to turn over to the City Health Commissioner the sum of \$3,600.00 to be used to buy equipment for the clinic.

Following the Memphis campaign the Unit returned to Chattanooga for an additional ten days to assist in getting their clinic on its feet and in successful operation. While here Major Butler was compelled to go to a hospital, suffering from a carbuncle. This incapacitated him for two weeks. After his recovery they proceeded to Bristol, where a splendid piece of work was accomplished. In this city children unable to pay for such service are sent to a private office on contract.

From Bristol we proceeded to Kingsport, where two weeks of splendid work was accomplished. Kingsport is a new, growing and progressive city, having an all time Health Officer in the person of Doctor T. B. Yancey, who lent us his full support. We were assured that, beginning with the next term of school, a Mouth Hygiene Clinic would be in operation. The local Red Cross Chapter agreed to turn over the sum of \$3,000.00 which they have on hand, to finance the operation of the Clinic for the first year.

The past two weeks were spent in Clarksville, where we found some splendid work had already been done by local members of the profession. In this city a plan has been put on foot whereby certain interested citizens are to buy a dental outfit which will be installed in the grammar school. Local members of the dental profession have agreed to contribute one and a half hours time each week.

It will be borne in mind that in most of the clinics so far established nothing more than prophylactic treatment is contemplated; however, a system of examinations will be inaugurated, these examinations to be followed up and the parents urged to have the family dentist make the necessary repair and restoration. A dental clinic undertaking more than this is not deemed practicable without a large corps of operators and a great sum of money.

A tabulation of the findings of examinations conducted by Major Butler, Miss Thornhill and myself is attached to and made a part of this report.

In addition to the work with the United States Public Health Service Unit above enumerated, I addressed County Teachers' Institutes in the following counties; Hamblen, Hamilton, Humphreys, DeKalb, Warren, Lincoln, Lawrence, Robertson, Sumner, Overton, Weakley and Dickson. I appeared before the State Parent-Teacher Association at their annual meeting in Chattanooga; also before the student body of the summer School for Teachers at the Middle and West Tennessee Normals.

In Hawkins and Hamblen Counties, in company with the Farm Demonstrating and Home Economic Agents, two weeks were devoted to a close campaign of these counties, two or more meetings being held each day. With the County Health Officer and County Nurse a number of rural community meetings were also held in Robertson County.

Your attention is invited to the fact that in many counties of the state

the County Mouth Hygienists representing this Bureau, assisting physicians and nurses, have done splendid work. In Rutherford County, for instance, a complete survey of all the rural schools of the county was made and I am informed that not only mouth conditions were considered but that eye, ear, nose and throat examinations were also conducted.

During the period covered by this report approximately twenty thousand bulletins have been distributed through nurses, school teachers and dentists.

Appended hereto, and made a part of this report, is a statement of the expense of this Bureau, covering the period from May 25th, 1920 to this date. These items of expense are covered by vouchers and are of record in my office.

Respectfully submitted,

A. G. BUCKNER

Summary of Examinations Conducted by Major H. B. Butler and Miss Verna Thornhill
of the United States Public Health Service, and Dr. A. G. Buckner,
of the Tennessee State Board of Health.

Schools	Number Examined	Caries	De- cayed 6 Year Molars	Maloc- clusion	Gingi- vitis	Fill- ings	Coated Ton- gues	Lec- tures
Total	3735	12882	2816	2211	1598	5049	3336	217
Johnson City	858	606	157	91	50	217	89	25
Greeneville	152	419	95	48	34	124	78	10
Morristown	337	199	203	98	31	307	168	8
Knoxville	385	1471	249	165	60	107	232	11
Fountain City	157	495	109	72	25	63	106	4
Maryville	352	1022	258	166	101	215	204	8
Cleveland	459	904	230	133	85	283	266	11
Hamilton County								
Chattanooga	291	1070	154	131	55	189	187	
Ooltewah								5
Tyner								4
Soddy								4
Salecreek								2
Clifton Hill								2
Third District	213	571	87	78	41	74	119	2
Open Air								2
Mt. Pleasant	243	198	72	95	45	175	110	6
Columbia								6
Nashville								
Clemons	324	394	149	167	70	440	225	9
Warner	248	534	108	129	48	82	147	9
Memphis								
Hill	338	939	158	149	145	109	137	22
Idlewild	383	651	154	47	163	786	243	11
Maury	102	290	72	39	25	149	74	8
Bruce	271	431	54	154	71	638	271	8
Murfreesboro	136	176	86	48	41	245	87	6
Bristol	207	432	109	125	63	285	70	14
Kingsport	529	1494	254	186	101	260	284	12
Clarksville	350	985	150	110	146	301	236	6

Expense of this Bureau, covering the
period from May 25th, 1920 to May 16th, 1921

Salaries	\$4200.00
Paper and Printing	1276.06
Travel-Official Expense	1086.70
Postage	85.00
Telephone and Telegraph Service	42.50
Office Supplies	71.15
Incidentals	28.29
	\$5790.30

READ !

Gather the knowledge of thy
life's vocation

Where'er thou find'st a
gleaning ne'er so poor:

Read thou! Thy lesson shall,
in Time's probation,

Ripen thy mind, which,
fruiting, shall secure

Thy place in honor, peace-
ful and assured.

This day is thine, but night
comes quickly on:

Though pleasure must have
way, be not allured

From Wisdom's pages e're
thy day be done.

DIAGNOSIS OF SYPHILIS FROM A DENTAL STANDPOINT*

BY WM. F. KING, M.D., INDIANAPOLIS, IND.
Assistant Secretary, Indiana State Board of Health.

I SHALL MAKE no apology or explanation for coming before you and discussing rather briefly the subject you will note on the program. You are all more or less familiar, I am sure, with the fact that for the past three years the federal government and now forty-eight states of the Union—because the state of Nevada within the last six weeks has made a legislative appropriation for venereal disease control work in that state, thus completing the list of states which have been operating through the medical department of the Army and Navy and the public health service in what has come to be known as the American plan for the control and elimination of venereal disease. I use both of these terms advisedly. I believe it is possible to control, in so far as, humanly speaking, anything can be controlled, the venereal diseases, and I believe it is also possible to eliminate the infection of venereal diseases, as certainly as we now believe and have reason to believe that the infection of yellow fever is practically eliminated from the civilized portion of the world. In fact, it would seem much easier to eliminate the venereal diseases than many other communicable diseases, because we now know the infection in both the venereal diseases, syphilis and gonorrhoea, and can identify them as easily and certainly as we can identify the criminal from the picture in the rogues' gallery. Not only is the cause of these diseases known but the methods of transmission and the habits of the diseases so to speak, are known, so that, as a matter of fact, from the medical standpoint, we know more about syphilis today than about diphtheria. We know more about syphilis than we do about scarlet fever or even smallpox, because the essential germ causing scarlet fever has never been isolated, neither has that of smallpox been absolutely isolated. Hence, there would seem to be no reason why an intelligent public, realizing the menace of these diseases, knowing the damage that these diseases are doing to the human race and working together intelligently, cooperating intelligently, should not bring about at least the highest possible results in their control and elimination.

There are two reasons why dentists should be interested in whatever is to be known concerning the venereal diseases and particularly concerning syphilis. The first reason is that dentists in their professional work come very intimately in contact with some of the lesions and manifestations of syphilis. It is neither unusual nor infrequent for a dentist in his work in the mouth of a patient to become infected with syphilis. Many of that kind are known in which it has been demonstrated beyond any doubt that infection

*Stenographic report of a lecture before the Indiana State Dental Society, 1921.

occurred in this way. It is characteristic of the infection of syphilis that it will enter the body at any point where the infection of the disease comes in contact with a break in the skin and we must get away from the idea that a consideration of syphilis is inevitably wrapped up with a consideration of illicit sexual intercourse or immorality, or that there is always a stigma connected with the disease. The fact of the matter is that a very considerable amount of syphilis is acquired extra-genitally. Just a few days since, a young lady came into the office, who had been sent by a physician of Logansport to call on the State Board of Health to see if some provision could be made for treatment, and who still wore on her lip the scar of the initial lesion, the chancre, that showed unerringly the point of entrance of the infection of the disease for which she was seeking treatment. She had been infected by kissing her lover who had syphilis in the secondary stage, with lesions in his mouth, and in this way transmitted the infection to her lip. So bear in mind that the infection may be transmitted through a break in the skin or mucous membrane, whether of the lips, fingers, or any part of the body, quite apart from the genital organs and sexual intercourse.

The second reason why dentists should be interested in a consideration of these diseases was referred to by your president. There is getting to be, and we are glad that it is so, a closer relationship between the dental profession and the medical profession in that both are leaders of public thought and of public sentiment, in all movements for public health and public welfare. Hence, members of the dental profession as leaders and as co-workers with the medical profession and with all philanthropic citizens who have at heart the welfare of the public, should have an interest in this wider conception and this wider consideration of the venereal diseases involved in the fight to control and eliminate these diseases.

I wish to call your attention to some figures which seem to me of special significance. Unfortunately, statistics oftentimes can be made to prove or disprove almost anything, but there are certain statistics that cannot be misunderstood and that tell very significant stories. We have heard it said that no less than eighty per cent of all men are at some time or other infected with a venereal disease. I do not know whether that is true or not, but I doubt it. But, we do know this, that a physical examination of some five million young men of this country between the ages of eighteen and thirty-one years, who offered themselves for military service, disclosed the fact that 5.6% of these young men at the time of their examination at home by their home selective service boards, had a venereal disease, either gonorrhoea or syphilis, in an active infectious state. These figures show nothing whatever in regard to chronic cases, latent cases and hidden cases—many of which were never discovered but include only such cases as were plain, on ordinary physical examination. The young men who entered military service represented a typical cross-section of the young manhood of this country, so that it is reasonable to assume that at any given time, at least 5.6 per cent of the young men of this country have a venereal disease in an active

and infectious state. These figures must stand as a record because it will not be possible to make a comparison unless the United States should, at some future time go into war and again find it necessary to physically examine five or six million young men, at which time it will be possible to make a comparison with the statistics of the World War.

I wish to call your attention to a series of cases which have been analyzed by Shearer, because these cases have a particular interest to dentists. Shearer has analyzed 14,590 cases of syphilis in which the initial lesion—that is the point of infection—was outside of the genital organs. Of the 14,590 cases so analyzed 3,880 were cases in which the primary infection occurred on the lips or 27 per cent of the total. 1,104 of these extra-genital primary lesions were on the tongue. 824 were in the mouth outside of the lips, the tongue and the tonsils, and 97 of these primary lesions occurred in the groin. It seems to me that when 27 per cent of the initial lesions in extra-genital syphilis occur in or about the buccal cavity, the question of extra-genital infection in syphilis is of very great importance to dentists.

You will be interested, I am sure, in a brief review of the work being carried on by the Bureau of Venereal Diseases of the State Board of Health. We have established in Indiana at the present time, nineteen venereal disease clinics, where skilled treatment may be had, free of charge, or at a comparatively little cost—the idea being to provide facilities, as far as possible for the prompt and intelligent treatment of venereal infections. We believe with Dr. Stokes of the Mayo foundation, that the best prophylaxis in the venereal infection is prompt, intelligent and active treatment. We are carrying on an educational campaign which has the cooperation and support of practically every organized group of citizens throughout the state. This educational campaign is carried on by means of public addresses, correspondence, distribution of educational literature, exhibits, illustrated lectures, moving picture films, etc. The two films I shall show this afternoon, one showing the diagnosis, pathology and treatment of syphilis and the other showing the diagnosis, pathology and treatment of gonorrhoea, are being used as a part of an educational campaign we are carrying on with the doctors of Indiana. It may seem like “carrying coals to Newcastle” to talk about educating the doctors in the diagnosis and treatment of the venereal diseases, yet, such a campaign is necessary because but comparatively few of the doctors practicing medicine are familiar with the modern diagnosis or treatment, particularly of syphilis. This is not to be wondered at, because most of our present knowledge of syphilis has come within the past ten to fifteen years, so that doctors who have been out of medical college fifteen years or more have not had the opportunity to become thoroughly familiar with the tremendous advancement that has been made in our knowledge of these diseases. It is our purpose to show these films before each county medical society in the state and to have every doctor in the state realize the importance of prompt action and intelligent treatment in the control of the venereal diseases.

The Bureau of Venereal Diseases is prepared to furnish educational literature to individuals or to group organizations for distribution. We have educational pamphlets for men, for women, for boys and mothers who wish to talk to their boys and girls on sex hygiene and sex relations. Pamphlets for fathers who wish to tell the story of life to the boy, as every father should tell to his boy, and as most fathers do not. Pamphlets for the general public and for the citizen who is interested in public welfare. We are glad to furnish these pamphlets to anyone, in reasonable quantity, for individual use or for distribution. It may interest you to know that in the past year we have distributed more than 300,000 such educational pamphlets in the State of Indiana and that fully 75% of these circulars have been distributed in response to individual requests. If the State Board of Health can be of service to you men in any way in your professional work or in the community, we shall be glad of an opportunity to serve you. If you wish to have some of these educational pamphlets on the table in your waiting room we will be glad to furnish them, and I imagine that these educational pamphlets would be read as often and would prove as interesting and helpful to your patients as the back number of *The Saturday Evening Post* or *The Ladies' Home Journal*, which many of you have on your waiting room table—some of them several years old.

The Bureau of Venereal Diseases is prepared to furnish a speaker for a public address at any time, or for an address before group meetings. We have several exhibits on physical fitness which are especially valuable to boys and young men, and in addition we have several moving picture films which tell the story of the menace of venereal diseases and which can be shown before groups or mixed audiences. This entire service is at your disposal at any time and we shall be glad indeed, to cooperate with you and in your home community in a campaign against the venereal diseases and for physical efficiency and race betterment.

If I were a dentist I would look with suspicion upon every sore in the mouth of a patient and if I could not protect myself in any other way I would wear rubber gloves while working on the mouth of the patient.

It is possible by taking a smear from the mouth, lips or anywhere else, under a microscope on a dark field, to show the spirochaetes, active and living, in the specimen. That is the quickest method of making a diagnosis in the initial lesion.

If a smear cannot be obtained from the lesion itself, it can be taken from an enlarged gland which is usually found in connection with the initial lesion.

The dangerous stage of syphilis is in its secondary stage. Mucous patches in the mouth become more numerous and contact with them invariably sets up the initial stage of syphilis. It would be well to be very careful, it seems to me, of any suspicious sore in or about the mouth of any patient.

The Wassermann test is usually negative in the primary and early second-

dary stages. This Wassermann test was only worked out in 1907, about fourteen years ago. The modern method in making a blood test is to take blood from the vein directly into a suction syringe.

The Wassermann test, instead of being the absolutely certain test that a great many doctors and a great many others believe it to be, is not an absolutely reliable or infallible test in and of itself. The real place of the Wassermann test in the diagnosis of syphilis has not as yet been definitely and fully established. However, it still remains and is the best single evidence of the presence or absence of syphilis that we have outside of the initial lesion and the demonstration of the spirochaetes in the initial lesion. It must not be assumed, however, that because the Wassermann gives a positive reaction that of itself is a positive indication of syphilis. It should be construed in connection with physical signs, the history of the patient and various other elements that enter into the making of the diagnosis. In any case where there is any suspicion of a syphilitic infection or a possible syphilitic infection, the individual should be advised always to have the blood taken and have the Wassermann test.

In the laboratory of the State Board of Health last year approximately 19,000 Wassermann tests were made and about 15,000 microscopic examinations for the infection of gonorrhoea. It may be of interest to you to know that the laboratory will make a blood examination or a microscopic examination upon the request or for any physician at any time without any expense. The laboratory insists, and I think rightfully so, that specimens should be sent in through physicians, but there is no distinction made as to whether the individual is able to pay or is not able to pay. The laboratory makes examinations for all. The making of a Wassermann test is a matter that requires skill and experience, and Wassermanns are best made in laboratories fully equipped and where there is opportunity for large experience in determining and interpreting the reactions.

In the third stage of syphilis the involvement of the central nervous system begins which leads to locomotor ataxia, paralysis, apoplexy, rupture of blood vessels, and so on. It has a peculiar predilection for bones and cartilages of the nose. That is why we get the case of saddle nose, where the cartilage has been destroyed and the bone caved in, which brings about the deformity known as saddle nose.

Hutchinson's teeth is considered to be absolutely diagnostic of congenital or inherited syphilis. There is another condition known as Boone's teeth that has to do with second molars, I believe, that is looked upon as being practically a positive manifestation of inherited syphilis. There is no doubt that we do not get Hutchinson's teeth in any other condition except congenital or inherited syphilis.

Locomotor ataxia is not always syphilitic but usually so. Paresis of the insane is now universally considered one hundred per cent syphilitic. Not less than twenty-five per cent of the insane in our institutions are insane because of the result of syphilis, so that the state is paying an enormous price

for the maintenance and upkeep of institutions to take care of the results of this one disease.

Very frequently when a Wassermann test of the blood is persistently negative a Wassermann test of the spinal fluid will give a positive reaction. It is not wise to say that syphilis does not exist until a Wassermann test is made of the spinal fluid, or at least the globulin test. The globulin test is very frequently depended upon in connection with the spinal fluid. Syphilis showing itself in the spinal fluid brings about a very considerable increase in the blood count, and then the globulin count will practically settle the question.

The use of new-arsphenamine has not shortened the treatment of the disease in the least. It requires two to two and a half years to bring about a negative Wassermann reaction of the blood. It does do this, however. One or two and sometimes three injections at the most of arsphenamine or neo arsphenamine will heal up all the superficial lesions of the disease so that, so far as the public at large is concerned, the individual is not infectious. This can be done with two or three injections of Salvarsen, where under the old method of administering mercury and iodid it would take months perhaps to bring about the same condition. Here is where the quack gets in his work. He guarantees to cure a patient of syphilis for so much money and will administer two or three injections of Salvarsen, the lesions heal up, and the individual is told that he is cured and the guarantee has been fulfilled. The individual goes out not cured but just merely partially treated. That is the viciousness of that practice. It is a practice, I am sorry to say, that is indulged in by some physicians, not very many.

One of the measures that we have developed in this state is a follow-up system, whereby an individual coming under the jurisdiction of the health authorities with syphilis or gonorrhoea is followed up no matter where he may go and kept under treatment until cured or rendered non-infectious.. The same follow-up system is in vogue between different states, and we have found it possible and necessary in some cases to follow them into other states until they are finally put under the care of physicians or under the care of clinics. We are developing as rapidly as we can and circumstances will permit, a social service whereby it is possible to rehabilitate many individuals. It may be of interest to you to know that in the City Hospital at Indianapolis, out of a total number of girls who have been detained in these wards ten have been put on their feet and employment found for them, and out of the ten, six or seven today are making good, which is some salvage out of the wreck.

The films I have shown you cover the main points of the American plan of combating venereal disease, and you will be interested perhaps to know that this same plan or modifications of it has been taken up by practically every European country and commissions and committees have been sent over to this country several times to study the American plan. Today, England, France, Switzerland, Sweden, Australia and even Austria are carrying on a nation-wide war against the venereal diseases. Dr. Stokes said in

Washington last November, that the campaign against venereal diseases is the biggest medical movement in our medical history. I believe that is true. In my experience there never has been a public health movement that has the force put behind it, the cooperation given to it and the unanimous cooperation and support of the public as this campaign against venereal diseases has had and we really have reason to believe that we are getting somewhere. We have a great deal of evidence to show at the present time, that we are really accomplishing results in controlling and eliminating venereal diseases.

QUESTIONS AND ANSWERS

The first question is: What is the safest method for a dentist to pursue if syphilis is suspected?

DR. KING: I think that would depend upon circumstances and the community where the patient lived. For your own protection I would say that you would be fully justified in handling the patient with gloves. I am speaking literally now, to handle the patient with rubber gloves, but if you have reason to suspect syphilis I would insist, that the patient, if he is not aware of this condition or is not aware that he does or does not have syphilis, go to a competent physician and have a thorough examination as soon as possible and whatever treatment was necessary. You are fully justified in doing that, but for your own protection use the rubber gloves and be particularly and unusually careful in handling and disinfecting and sterilizing your instruments. You do not want to be responsible for even taking the remote chance of transferring the infection from one individual to another.

The next question is: Is pernicious anemia usually caused by syphilis?

DR. KING: Syphilis is a frequent cause.

The next question is: What are the microscopic characteristics which differentiate a malignant epithelioma of the mouth from a primary chancre?

DR. KING: I do not believe I can tell you what you can depend upon as indicating a chancre. If there is a suspicious sore about the mouth, the only way you can determine whether it is or is not syphilis is by finding the spirochaetes, as shown in the films. That is, by dark field examinations under the microscope. If you find the spirochaetes, you no need to worry about an epithelioma.

The next question is: Has hydrocephalus any connection with congenital syphilis?

DR. KING: Hydrocephalus may or may not be a manifestation of congenital syphilis or syphilis in the parent. In a great many cases it is one of the deformities of fetal life that is due to syphilis, not always though.

QUESTION: How long after a case has been arrested would you consider it a permanent cure? Does the tertiary stage always appear?

DR. KING: No, the tertiary stage may not appear following early treatment. In fact, we are led to believe, and I think there is some reason for this belief—that a case of syphilis can be aborted. Attempts have been made to abort syphilis by cutting out the initial lesion on the theory that up until the time the initial lesion begins to appear the spirochaete has not entered the blood. On the other hand, it has been shown that if diagnosis can be made within a very short time, a day or two or a few days at least after the first appearance of the initial lesion, prompt energetic over-treatment at that time may abort the disease. At any rate syphilis, taken very early, and treated promptly, over-treated rather than under-treated, may not and in many instances does not go on to the manifestations of the tertiary stage of the disease.

QUESTION: What does a mucous patch look like?

DR. KING: It varies. It depends somewhat upon how it has been handled. A mucous patch undisturbed has a sort of punched-out appearance, more or less sharply defined edges, covered usually with a dirty, greasy exudate or membrane. Such mucous patches in the throat have been easily mistaken for diphtheritic membrane. If the individual is a tobacco user or smoker or has been attempting to treat this mucous patch in the mouth you will find instead of a greasy exudate a more or less sharply defined punched-out radiant base. But, the characteristic typical mucous patch in the mouth is as I have first described—more or less regular in shape, more or less sharply defined edges, and a dirty, greasy exudate covering most of the surface of the patch.

QUESTION: Is it easy to confuse trench mouth with a syphilitic condition?

DR. KING: I do not know anything about a trench mouth.

QUESTION: Is a test of the spinal fluid more reliable than a blood test in determining syphilis?

DR. KING: Yes and no, depending upon the stage of the disease. In the secondary

stage, you might not get a positive reaction from the spinal fluid when you would get a positive reaction from the blood. In the tertiary stage, particularly in those cases where there is some involvement of the central nervous system, you will find frequently and in fact you will find in most cases you will get a positive reaction in the spinal fluid even when you have repeated negative reactions from the blood, and certainly in those cases the result of the spinal fluid test is of more accuracy and is more dependable than that of the blood.

QUESTION: Are not enlargements of bone on the alveolar process indications of syphilis, growths as large as a pea?

DR. KING: I do not believe they would be, taken by themselves. They might be part of the general picture. I am guessing at this to some extent or, rather, reasoning by analogy. You would be apt to find those in cases of congenital syphilis, and along with that you would find in all probability indications of malformation of the teeth, characteristic Hutchinson's teeth. I would not want to say that the mere finding of bony growths on the alveolar process is of itself an indication of syphilis.

QUESTION: Is aneurism of the aorta a sign of positive syphilis?

DR. KING: A great many aneurisms are the result of syphilis. There is no doubt about that. Aneurism may be brought about, however, in other ways, but the significant thing about it all is that whereas ten years ago such a thing as syphilis having anything to do with aneurism of the aorta or the early death of an individual thirty-five, forty or forty-five years of age was hardly considered, yet today, with the knowledge that has come to us through the finding of the spirochaetes of syphilis and the Wassermann blood test, we know that a very considerable per cent of aneurisms of the aorta are manifestations of syphilis, and that a very considerable number of premature deaths shown on the death registers under the name of heart trouble or heart failure or heart disease are in reality due to syphilis.

MANAGEMENT OF MYSELF

Object: To make me more efficient and successful.

I am going to be master of myself. I am going to manage my body, so it will be the very best servant I could have.

I mean to have my body in such perfect condition that my brain will do better work than it ever did before.

I will have my brain working so efficiently that it will give only such orders to my body as are necessary. I mean to have my brain eliminate all lost motion and save my energy.

I intend to make this my best year, physically, mentally, morally, financially, and socially.

N. C. R.

ETHICS AND THE DENTAL SPECIALISTS*

BY J. T. EDWARDS, D.D.S., FORT WORTH, TEXAS.

APPARENTLY the subject of dental ethics is becoming more complex as dentistry branches off into its various specialties. The responsibility and demands that are thrown upon the dentist are becoming greater each day. The medical profession is demanding our assistance in combatting the many ills of the human race. The public has learned to look to the dentist in search for health and relief from constitutional disturbances; and, as our profession passes through the evolutionary period, we are brought into closer relation with the physician and the medical specialist; consequently, our ethics in the same ratio becomes more complicated.

Ethics to the dentist is a sort of a religion. It is our concern for the well being of our patients. When these cases of referred disturbances with suspected dental origin come to us, we are confronted with the problem of the patient's well being on the one side, and our ability and willingness to be of service on the other.

Then, how are we to render such service as will result in the greatest benefit to our patients? For the benefit of the patient, all personal feelings should be eliminated if they should prevent us from referring a patient to a brother dentist whom we believe could render better service in the particular line the patient is seeking. The pyorrhea man, no doubt, is capable of and does render better service to the pyorrhea patient than is possible for the general practitioner to render. It has been said that orthodontia and general dentistry are as oil and water—they cannot be mixed. I believe, in a sense, this is true; likewise, it is also true of exodontia, pyorrhea or any of the other specialties in dentistry.

Physicians often send their patients to the dental specialist for examination, whereas, in my opinion, they should be referred to the family dentist first and, if on examination, the dentist finds it advisable to have X-rays or extractions, he should, in turn, refer the patient to the specialist; and, after the specialist has done what he thinks is necessary, the patient should then be put back in care of the family dentist and physician.

With reference to the X-ray I will say, that any dentist who attempts to crown or repair in any way a tooth which has been previously treated, should by all means, have the tooth and surrounding tissues X-rayed. While I know that the X-ray picture is not always infallible, yet it is such a potent factor in diagnosis that we have no right to deny our patients this valuable service which they deserve.

A man came to me a few weeks ago suffering with an enlarged sub-

*Read before the Texas State Dental Society, 1921.

maxillary gland. I X-rayed the lower first molar which had recently been restored with a beautiful inlay. The picture showed an abscess on each root. The tooth showed a steel broach through the distal root, which to the best knowledge of the patient, had been there six or seven years. To my mind, such practice is totally inexcusable in any man who pretends to do modern dentistry.

When utilized in the proper manner, the X-ray machine is, undoubtedly, one of the most valuable inventions we have today; but the dentist who installs one with the principal object of selling pictures, thereby adding to his income, takes undue advantage of his patients and commercializes his profession. The radiologist should simply make the picture and leave the dentist to make his own diagnosis.

In an editorial appearing in one of our recent dental journals, the writer comments rather disparagingly on the teachings and practice of the removal of pulpless teeth. Now, I will agree that many teeth are extracted that perhaps should not be, and some are surgically removed that perhaps would have been as well extracted; but I do not agree with the writer of the editorial that men—once ethical and respected—have “turned hi-jack” and gone into oral surgery, and that they advocate the surgical removal of a tooth to make the operation look serious, thereby throwing a lot of scare into the patient, enabling him to collect a fee which is out of proportion to the service rendered. On the contrary, I believe that there are many cases where the surgical removal is the only safe and sane method.

As to the fee, the patient's well being is also to be considered; but I do believe that the man who has his office appointed with special equipment, who has trained his mind and hands along a special branch of dentistry and confines his efforts to his limited line of work, should receive more for his services than one who has no special training or preparation, and whose practice is not confined to such a narrow field. Now, I do not wish to convey the thought that the specialist assumes more knowledge or puts himself in the attitude of superiority to the general practitioner or, that he should receive a greater competency than the operative dentist; for after all, we each have our part to play in alleviating the bodily ills of the public.

REMOVABLE BRIDGEWORK; ITS PLACE IN DENTISTRY AND
THE FUNDAMENTAL PRINCIPLES OF CONSTRUCTION*

BY R. E. HUFF, JR., D.D.S., WICHITA FALLS, TEXAS.

THE TITLE of this paper could be made to cover a vast multitude of appliances, but I intend to restrict it entirely to one type of restoration, that of the cast clasp appliance as advocated by Dr. F. E. Roach.

A review of the dental literature of the past few years shows conclusively that we have put on the brakes when it comes to the indiscriminate destruction of healthy pulps, and I firmly believe that all of us should make a thorough investigation and study of an appliance which means the conservation of pulp and tooth structure. The cast clasp is such an appliance, and, used where indicated, cannot be excelled by any known attachment now before the dental profession. It is especially indicated where mutilation of the abutment teeth is not desirable and in short span cases, although it may be very successfully used in long span casts. However, if we expect the clasp to be efficient we must develop a technic whereby we can produce a clasp which will fit the tooth to which it is attached. It must fit the tooth accurately and firmly and should be so constructed that it will stay in one definite position on the tooth. The position may depend on some form of occlusal rest or may be maintained by the natural contour of the tooth. Another feature we must strive for is the reciprocal pressure on all sides of the clasp. In other words, the finished clasp should grip the tooth at the extreme ends of the clasp arms, as well as the other portions of the clasp. This grip is highly desirable because the masticating force applied to a clasp type removable bridge tends to move it principally in three directions: gingivally, mesially, and distally. Three inclined planes are brought into play in each clasp, one at the occlusal rest and two at the ends of the clasp arms. All of these forces must be correctly counterbalanced by a strong resistant grip or the bridge may fall in time, due to the opening and loosening of the clasps or the shifting of the abutment teeth. Comparatively slight gripping power is required to retain the bridge against all ordinary efforts of mastication, but great strength is required in the clasp arms to keep the abutment teeth from migrating and consequent loosening, and to limit the lateral motion of the piece.

There is a danger about these clasps that we must not overlook, and that is the possibility of decay around them. This is the chief objection that continually arises from the use of these clasps and it is a very justifiable objection. However, we can polish the surfaces so that the clasp can easily be kept clean, and point out this danger to the patient, instructing them how to keep the appliances clean. It is our duty to see that they are informed and instructed; then it is their duty to follow our instructions. But

*Read before the Texas State Dental Society, 1921.

suppose they do not follow our instructions. Perhaps decay will occur; perhaps it will not. If it does not, 'well and good'; if it does, then place a filling. Take for example, the loss of the lower molar with the bicuspid and second molar normal. Is it better to mutilate these good teeth or place clasps and risk the chances of decay?

There is another feature of this type of appliance that we must watch and that is, the judicious selection of cases where saddles are to be used. And right here I might say that there seems to be a misunderstanding among some members of the profession as to just what is meant by the term 'saddle'; many men giving that name to any construction that approximates the gum tissue. To be a true saddle it must gain its support from the tissues, otherwise it is only a cervical surface. In restorations requiring the extensive use of a saddle, we must not place this type of clasp in cases of recent extraction, for the following absorption of the ridge will leave the leverage of mastication on the abutment teeth, which will result in their premature loss. If we wish to use this type of clasp in these extension saddle cases, we must construct the saddle of vulcanite and add to it as the alveolar ridge is absorbed until complete absorption has taken place and the ridge has become firm. Then we may construct the appliance of gold and porcelain, using the same clasps.

For convenience, the clasps are divided into three classifications: the Mesio-Distal Grip Clasp, the Embrasure Grip Clasp, and the Bucco-Lingual Contour Grip Clasp. The Mesio-Distal Grip is employed on the six anterior teeth. It takes advantage of the anatomical shape of these teeth on their lingual surfaces, with a grip on the mesial and distal sides and extending slightly to the labial surface, to make a reciprocal pressure for the lingual portion of the clasp. If the tooth to be clasped has a contact point with the adjacent tooth, it must be dressed down with a safe-side separating disc, being careful not to mar the approximating tooth unless it is necessary to remove a portion of this in order to get the required space. All of the convexity must not be removed as a slight portion must remain for the mesio-distal part of the clasp to grip. The impression for the clasp must be absolutely accurate and to do this it is taken in sections, first, the lingual and then the labial. Take a piece of modelling compound about the size of the first joint of the little finger and soften it thoroughly by dry heat. Then shape it into a cone and press it firmly to place on the lingual. After thoroughly chilling with ice water, trim away all portions from the labial and down to the contact point on each side so that impression may be removed lingually without becoming distorted. Replace in position, and while firmly held in place, take an impression with the same material of the labial surface. Remove and seal the two sections in proper relation and fill with inlay investment compound. When this has set, the compound is removed and inlay wax melted carefully to the model in shape and thickness as is desired for the finished clasp. Then fit sprue wire, trim off excess part of model,

invest wax and remaining portion of model and cast in the usual manner, using Ney's Oro E. or similar gold.

The Embrasure Grip Clasp is particularly adapted for use on the bicusps. The impression is made by the use of Complaster in a split tray and then filled with investment compound. After this has set the complaster is dissolved by placing in cold water and heating just past the boiling point. Then melt inlay wax on the model in much the same manner as for the Mesio-distal Grip, except of course the wax must terminate at the lingual embrasure of the approximating tooth. For the embrasure hook, Ney's elastic wire 17 or 18 gauge is used. This is bent so that one end may be heated and inserted in the wax at the lingual embrasure and the other end rest securely in the buccal embrasure. Then proceed with flasking and casting as described above.

The Bucco-Lingual Contour Grip Clasp is especially adapted for use on the molars. It takes advantage of the bell shape of these teeth and grips the occlusal and gingival restrictions on the buccal and lingual surfaces. To aid in stabilizing it, there may be a slight lug projecting onto the occlusal surface. If the tooth to be clasped presents excessive convexity, it may be necessary to dress down the buccal and lingual surfaces with a small stone as the clasp material may not have sufficient elasticity to be sprung over the contour. This grinding does not go through the enamel and in no way injures the tooth. The material used for the impression of this clasp is complaster and the technic followed is the same as has been described.

In constructing saddles for these cases it must be remembered that they should be perfectly adapted to the underlying mucosa and this can best be accomplished by the casting method. As in all of this work, a perfect impression is required from which to make a model. The wax pattern is made from Kerr's sheet wax and should cover a sufficient portion of the ridge to withstand the stress of mastication, but should not encroach upon the gingivae of the approximating teeth. Before investing the finished pattern, a small roll of wax should be attached at the opposite end from the sprue and bent back out of the way. This forms a vent which helps to make the gold flow into all parts of the mold and is to be cut off after casting. Having finished the saddle, we are ready to take the final impression to get the proper relation of the clasps, saddle, and teeth. While this impression is being made, pressure should be applied to the saddle so as to slightly compress the underlying mucosa. This is best accomplished by cutting a small hole in the side of the tray and holding the saddle down with a blunt instrument until the complaster has set. Care should be taken to apply this pressure evenly so that the tissue under both ends of the saddle will be compressed. The next step is to construct a model, assemble the clasps and saddle, and mount on an articulator. From this point it is finished as any ordinary bridge, using your own preference as to the materials employed.

In conclusion, I wish to say that it was with a great deal of hesitancy

that I consented to present this subject for there are so many members who have had much more experience with this kind of work than I have. But if anyone has gotten an idea or thought that will be of benefit to them in their work, then I have been amply rewarded for the time and thought expended in preparing this paper.

You want success, but are you willing to pay the price for it?

How much discouragement can you stand?

How long can you hang on in the face of obstacles?

Have you the nerve to attempt things that the average man would never dream of tackling?

Have you the persistence to keep on trying after repeated failures?

Can you keep your mind steadily on the single object you are pursuing, resisting all temptations to divide your attention?

Have you the patience to plan all the work you attempt; the energy to wade through masses of detail; the accuracy to overlook no point, however small, in planning or executing?

Are you strong on the finish as well as quick at the start?

Success is sold in the open market. You can buy it. *ANY MAN CAN BUY IT WHO IS WILLING TO PAY THE PRICE*—The Efficiency Magazine.

REPORT ON DENTAL SCIENCE AND LITERATURE*

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(CHAIRMAN COMMITTEE)

A REPORT ON DENTAL SCIENCE and literature might obviously present no limitations in magnitude, as the field to cover is large and the material to review, if consideration is given to all subjects therein, also almost unlimited. Therefore, no attempt will be made to outline the progress and status of the various phases and numerous subjects of what, at the present time, constitute the profession of dentistry. This would necessarily be either a formal, condensed generalizing statement of no use to anyone, or a very lengthy, burdensome, detailed review, carrying too much tedium for your hearing, giving you, in an attempt to cover the vast ground, a smattering on this subject and a smattering on that subject, a mess conducive to mental indigestion. Somewhat of a compromise between the two might be more palatable.

With the exception of mentioning a few outstanding facts and features of dental science and practice, for the most part this report has to do with the problem of tooth treatment; a problem which, of late years, has demanded the best efforts of dental science, since it has been discovered that certain of pulpless teeth bear a morbid relation to the human economy.

Dentistry is one expression of this application. While it is a specialty of the healing art, it is likewise subdivided, the tendency being, in more recent years, that each subdivision be practiced *per se* as a profession; for example, Exodontia, Orthodontia, Prosthodontia, Prophylaxis and Periodontia, etc. The fact that dentistry is at present practiced in this manner and that there is a persistent inclination further in that direction is evidence of progress in a gaining of knowledge and a better understanding of what is to be required of the dentist.

He is specializing almost because of necessity—the necessity being forced upon him by the rapid advance of his profession, because of greater responsibilities and demands placed upon him, and because of an ever-increasing elaboration and changing of technic in which he must become capable. Recent progress in dental science has brought to the general practitioner such numerous opportunities to adopt new ideas, methods and technic that he finds it difficult indeed, if not impossible, to keep quite up to date and to render his best service if he attempts to follow all departments of dental practice. Hence, specializing is due to and evi-

*Report of committee on Dental Science and Literature presented at the Indiana State Dental Society, 1921.

"Pure science seeks by precise methods to determine the truth by elimination of error and thus to discover the relation of cause and effect in certain orders of phenomena. Applied science is the utilization of the underlying principles or natural laws governing phenomena in their application to the needs of man."

dence of the continued expansion of the science and art of dentistry. Further evidence of this scientific advancement is the establishing of special courses of instruction and training for practitioners by skilled artisans and the formulation of post-graduate courses by the dental schools.

Dental science is enriched year by year by the innovations recommended by the dental authorities. After these ideas, discovered and brought out by dental practitioners and research workers, are subjected to the test of further clinical experience, some die, others live, accordingly as they express error or truth. It can be observed that the profession is making an effort to develop a standard technic in the various lines of practice that has in recent years been born into the realm of dentistry. Referring to this we may mention the gold inlay, the casting process in general, the removable bridge, the more efficient full denture of Hall and House, the plastic porcelain filling and conduction anesthesia. These operations represent the scientific achievements, which, while in a sense new, have passed through the period of laboratory and clinical evolution and each now may be said to be practically applied by a standardized technic.

Innovations in dentistry which are proven to possess desirable practical virtues have an effect upon the older forms of practice, whose functions and purposes are related. Thus observe that the cast inlay and plastic porcelain have, for the most part, displaced the foil filling; removable bridgework and partial dentures are being used more instead of so many fixed bridges—the latter on account of their unsanitary features are considered by some authorities to be in disrepute—however, the fixed bridge is still a useful form of restoration and its service so well recognized that its prominence in dentistry still exists.

The various operations upon and about the teeth and jaws are all done by a more or less established form of technic, with the possible exception of pulp treatment. Lack of scientific knowledge is a handicap in the exercises of intelligent judgment. A correct diagnosis may be perfectly easy but when there are many methods which might be employed in the case, each one of which is termed the better treatment by some authorities and the opposite by others, the operator finds himself in a dilemma and unable to intelligently adopt any one as the proper specific. However, any technic developed to a degree of skill that will produce desirable results, whether it is an expression of empirical or scientific knowledge, may be regarded and used by that operator as his specific. This applies with particular emphasis to the procedure of tooth treatment, from which devolves these questions:

What method of devitalization is safe?

What method of filling root canal is best?

Should we treat and try to save pulpless teeth—and if we treat them, with what and how?

If treated, the technic should be one that will render the tooth harmless to its supporting tissues and to the rest of the human organism and to

maintain such a condition as long as possible. Heretofore little effort has been made by members of the dental profession to keep case histories and to check up results, a procedure which would produce data from which valuable deductions might be made. In a paper read before the Illinois State Dental Society, March, 1920, and published in the *National Dental Journal*, February, 1921, Dr. Arthur D. Black discussed some of his clinical studies of pulp treatment and illustrated case-history forms upon which records of each case could be made and kept. In the first part of the paper he says, "There are two principal avenues by which knowledge of diseased conditions is advanced—laboratory investigations and clinical studies. In considering the pathology and treatment of dental pulp, our most important laboratory investigation in recent years was that of Dr. Thomas L. Gilmer on the bacteriology of chronic alveolar abscess. Valuable studies of the relation of mouth foci to metastatic infections and of the tissues immediately surrounding the mouth focus have been reported by many investigators. Additional studies are in progress. We particularly need to know more of the activities of the residual filaments of pulp tissue in cases in which there has previously been formation of secondary dentin, and of the possible building of cementum in the apical region subsequent to pulp removal.

There has been little progress in scientific clinical studies. We have been surfeited with the opinions of numerous writers, but the opinions very generally have been presented without a background of case histories upon which they should have been based. I do not recall a single article on pulp and root canal treatment in the past ten years which included definitely recorded case histories as a basis for the arguments presented or the opinions expressed. All that has been written during the past decade has served to establish in the minds of most practitioners a more or less definite notion that chronic abscesses may cause systemic disease and it is therefore important to conserve the pulp and to improve our technic in root canal operations. To what extent there has been improvement in practice is difficult to judge, since we have no basis from which to calculate."

Further on in the paper Dr. Black states: "That which is most needed now is a careful survey and check on clinical procedures. Arsenic has been used for nearly a century to destroy pulps, and we have no definite proof today that it does, or does not, penetrate to the apical tissues and destroy them, thus preparing the field for the establishment of a chronic abscess. Phenol preparations containing formalin and other tissue-destroying drugs have been used for years, and we do not know if their use results in the formation of chronic abscesses. We are not certain that the use of cocain by pressure anesthesia is harmless to apical tissues, particularly if a vital pulp is infected when the cocain is applied. For scores of years we have been removing dead pulp and placing root filling, and recently the question has been raised as to whether all such teeth should be extracted. It is a decided reflection upon the dental profession

that we have not at hand the clinical evidence in form to settle these and other equally important questions."

In a review of his cases recorded the report shows a reduction of over fifteen per cent in the number of pulps destroyed in the past five years, as compared with the preceding five years, also that the use of arsenic has almost been abandoned in the past four years. In conclusion he gave the opinion that "much of the uncertainty that now exists relative to pulp and root canal treatment can be removed if a reasonable number of dentists will undertake to make a serious clinical study of the problems involved;" and added that he believed that "the dental profession must develop a conscience which will force it to think a little more of its duty to the public in the employment of the most tireless and painstaking technic."

Owing to the fact that in the past few years a long list of systemic infections has been compiled and responsibility for their existence being fixed upon the retention of pulpless teeth, there have been wholesale extractions, inaugurating a business boom for the exodontist and prosthodontist. The dental profession, unable to solve the perplexing problem any other way at the time being, acted at once upon the line of least resistance to relieve the situation as best they could and resort to unheard of extravagance of extractions, was made. After a season of this wanton removal of teeth, due to lack of knowledge and good judgment of both physician and dentist and observations of results to the patient, clinical experience showed this procedure to be not the panacea for these ills it was assumed to be, but bringing favorable results only in a few of the cases. This observation led many of us to believe that not all pulpless teeth need be extracted, but if treated in a manner to be made harmless to the patient and maintained in a well functioning order, it was deemed proper to apply such treatment and retain the tooth. The question then arose: just how bad must a tooth be to be unmistakably consigned to the forceps? In deciding this question the X-ray has become an invaluable aid. To help clarify this problem, a few extracts from a report of investigations made by Drs. Thomas P. Hinman and Harry B. Johnston, of Atlanta, Ga., may be cited:

"When it has been determined that a pulpless tooth showing a rarefied subapical area is to be treated with the expectancy that this subapical area will return to normal, the following questions arise:

"What is the condition of the apical cementum and how can this condition be determined?"

"The condition of the apical cementum can be determined by the careful examination of good clear X-ray pictures—not the usual type so often seen in which a central incisor root is shown to be so long that it looks like a Lombardy poplar—but a picture that shows accurately the root length, the end cementum, the lamina dura and bone trabeculae. If the apical cementum shows rarefaction, no amount of treatment will avail. On the other hand, if the apical cementum shows no rarefaction, treatment is indicated. If the apical cementum shows condensation, treatment is again indicated. In cases where we have condensation or adventitious cementum, the sections of the root ends have shown that the majority of the foramina are closed; frequently only a single apical foramen is open, from which it would seem that nature has endeavored to close off infection. This condition of the apical cementum is clearly shown in correctly taken, accurate X-ray pictures."

"What is the condition of the subapical bone, and how may we determine this?"

"The condition of the subapical bone should be clearly shown in the X-ray picture and is readily determined by a correct reading. This condition is of great importance in determining the question of treatment, for if this bone is infiltrated and there is no definite limited area, we have a condition of bone infiltration known as rarefying osteitis. The area of destroyed bone is usually very much larger than is shown by the X-ray picture. This has been determined by frequently cutting down on these areas and examining them. Cases of this type do not yield readily to treatment, and where the area is of considerable extent, treatment is contra-indicated even if the apical cementum be in a very good condition. It has been noted in these cases that the resistance of the patient, is, as a rule, very low and nature apparently has made very little effort to wall off the infection and prevent its spreading. In treating destroyed apical areas the general physical condition of the patient should always be a consideration. In the other type, where the destroyed area is surrounded by a line of condensed bone which seems to limit the infected area, apparently nature has attempted to wall off this diseased area and a condition very similar to that shown by Sir Kenneth Goadby in his 'Bone Studies of Latent War Wounds' is apparent. Sir Kenneth Goadby calls these areas, 'Loculi'. Areas of this type, where they are not too large, bid fair for treatment if the apical cementum is not absorbed or shows condensation."

"After determining that conditions are favorable for treatment, what methods should be used to bring about a condition favorable for restoration of the subapical bone, and may we expect a reproduction of the destroyed area?"

"For a great many years the treatment of root canals and periapical diseases has been empirical, and we are all familiar with the old methods of the use of the essential oils, phenol, iodine etc., and apparently these methods are still in vogue in some localities. The futility of these procedures is too well known to require comment, but there is one thing to which I wish particularly to call your attention, and that is to the nostrums which are on the market for the purpose of clearing up the diseased areas. These nostrums are advertised in our dental journals, and that operators are using them to some extent is indicated by the immense sale they have. As the tooth does not give any trouble after the canals are filled with these materials, the dentist believes that the disease has disappeared but as a matter of fact they are the most dangerous of all materials used in root canals, for in a majority of such instances, the substance used has pernicious power to reduce the vitality of the apical cementum as well as the periapical peridental membrane, and by lowering their vitality and resistance, produces a nidus liable to infection either through the blood stream, or by the lymphatics, as has been shown by Noyes. The use of any medicated material in filling root canals is both unwise and unnecessary. If the material used has sufficient germicidal power to destroy bacteria, it will also have sufficient power to lower the vital resistance of the apical area. It has been my observation that any substance which contains formaldehyde gas is a dangerous substance to use in a root canal."

"In what length of time should we expect bone restoration?"

"The length of time required to rebuild the destroyed area around apical root ends is from four to twelve months, this depending very largely on the amount of area destroyed."

"Are teeth so treated no longer a menace to health?"

"So far as we have been able to judge, after four years of experiment, teeth that have been so treated, which show a bone restoration of the character of which we are speaking, have not produced any injury to the patient. In fact, where we have cleared the mouth of other teeth which have been more seriously diseased and have extracted these teeth, there has been no return of the symptoms from which the patient was suffering."

Drs. Hinman and Johnston, after extensively experimenting with a great many methods of canal opening and filling, have chosen the Callahan method because of immeasurably superior results. Briefly stated, the Callahan method consists of the use of dilute sulphuric acid as a decalcifying medium to assist in opening the canals, followed by a saturate solution of sodium-bicarbonate, causing a rapid effervescence which effectively clears out all debris. The acid is also a powerful, though superficial germicide. After dehydration, the canal is flooded with a solution of chloroform and resin in the proportion of twelve grains of resin to three fluid drams of chloroform. A point of pure base plate gutta-percha only slightly smaller in diameter, but longer than the canal is then selected, passed into the canal and caused to dissolve in the chloroform by a rapid though delicate pumping or stirring motion. A full

account in detail of this technic can be found in the February, 1921, issue of the *National Dental Journal*, Page 88.

A valuable treatise in detail on technic of root-canal filling was presented by Dr. Edgar D. Coolidge, of Chicago, at the National Dental Association in Boston, 1920, and was published in the *National Dental Journal*, March, 1921. In this article special emphasis is made upon the technic of thoroughly opening the canals to apical region and the maintenance of asepsis during the operation, mentioning the various details that enter into the promotion of a favorable prognosis. This article is recommended to all those interested in better root-canal work.

Statements taken from a paper written by Dr. Maurice E. Peters, and published in the *Dental Cosmos*, January, 1921, show the results of investigations by various authorities upon the subject of sterilization of apical areas.

Dr. Garvin, of Winnipeg, Canada, describes the opening of an area, which, six months after treatment through the root canal showed little signs of healing. He burred away the root end allowing the shavings to fall into the cavity in the bone. These shavings, etc., were cultured and found to be sterile. Dr. Crane, of Washington, states that his bacteriologic examination of these regenerated bone areas shows them to be commonly sterile. Dr. Herman Prinz states that experimentally, proof can now be furnished that infected apical areas and even granulomas may be completely eradicated by the application of dichloramine-T solution, provided that the solution is brought into intimate contact with the infected zone. Dr. Price states that the silver reduction method advocated by Dr. Percy Howe and the application of iodine and formalin will each positively sterilize pulp canals and dentin. Dr. Hartzell, in a report on the relative efficiency of agents used in sterilizing root canals of infected teeth, as measured by two treatments of forty-eight hours each, reports ninety per cent efficiency from formalin and seventy per cent efficiency from tincture of iodine, chlorophenol, formocresol and iodine creosote. Dr. Matilda Brooks, of Boston, found that the most commonly used root canal dressings failed to sterilize infected dentin, but found Howe's silver reduction method to be from sixty-nine per cent to ninety-five per cent efficient. Chlorazene, four per cent, aqueous solution, using six treatments of six days each, she found to be one hundred per cent efficient and non-irritating.

With this quite complete list of sterilizing agents and methods, it should be possible for us to select one to suit our needs in every case where treatment is indicated. But we should not lose sight of the fact that, hand in hand with the use of any sterilizing agent, should go a thorough mechanical cleaning of root canals.

In order to lend to the completeness of this report upon the subject of treatment of pulpless teeth, and to gather some information which might further reveal what the prevailing thought is regarding this perplexing problem, and to ascertain how the future dental practitioner is being

taught to cope with the situation, a short questionnaire consisting of four questions was prepared, accompanied by a letter kindly requesting answers to the questions, and sent to forty of the dental colleges in the United States. Up to the date of the writing of this report, thirty colleges had responded.

The questions were as follows:

IN YOUR COLLEGE CLINIC:

1. Which of the following methods of devitalizing teeth is given preference?

- (a) Arsenic
- (b) Pressure Anesthesia
- (c) Conduction Anesthesia
- (d) Mention any other method you may be using.

2. In the treatment of putrescent pulp and teeth showing abscess, do you use:

- (a) Formocresol
- (b) Silver nitrate
- (c) Dakin solution
- (d) If none of these, what do you use for such conditions?
- (e) Have you discontinued the use of any of the three above mentioned preparations?

3. With what material do you fill root canals?

4. Approximately what per cent of permanent teeth showing chronic abscess do you attempt to save?

A request for further remarks not contained in the answers was made to which some response was given in a number of instances.

In regard to the first question, that of devitalization, the returns showed that over half expressed a preference for pressure anesthesia, conduction anesthesia second, and arsenic third.

One return from the West says: "Devitalization is discouraged as much as possible and treatments are avoided. It is strongly advocated on the Coast to extract all pulpless teeth. This is considerably modified and taught in the college to use discrimination as to best indications prevailing in individual cases. This question is greatly discussed in the Coast Societies and is not a settled one."

The returns showed that where arsenic was used, that its use was confined to multi-rooted teeth and in infected pulps. Recent exposures indicate use of pressure anesthesia as first choice and conduction as second. In two instances infiltration method was mentioned as a possible choice. "We avoid the use of arsenic and employ conductive and infiltration anesthesia wherever possible." "Students are instructed in all three methods of devitalization but preference is given to conductive anesthesia."

Another return reads, "Arsenic is our first choice. We do not permit removal of pulp until after a week or ten days following devitalization. The object of this delay is to permit all of the fibrils and pulp tissue to

become loosened and thrown off, thus making it easier to remove all of the pulp from the root canals. Pressure anesthesia is the second choice and is preferred to conduction anesthesia for the reason that no other tissues are involved excepting those that are to be extirpated. We consider pulp extirpation before fibrils and pulp tissues have been exfoliated to be a hazardous and uncertain method, due to the fact that there may be more than one foraminal opening and portions of the pulp tissue are likely to be torn off and remain within the root."

Another return stated, "Less trouble with arsenic than any other method if used properly."

Another, "Arsenic on multi-rooted teeth, pressure on single-rooted teeth and conductive in special cases."

Another from a very large and prominent school reads, "Arsenic very rarely used."

Taking up the second point of the questionnaire, "What drugs do you use in the treatment of putrescent pulp and teeth showing abscess"—the returns showed a substantial majority preferred formocresol with the remainder equally divided between Dakin solution and silver reduction, while a few, to be exact, six, were employing for this purpose dichloramine-T.

Returns from one college in the northwest stated: "We have but one use for formocresol and that is in cases of putrescent pulp when it would be dangerous to undertake the entire removal of this poisonous material from the root canals. It is admissible to place formocresol in the pulp chamber for the purpose of sterilizing and making harmless the remaining putrescent material in the root canals, before attempting its removal. We do not use formocresol under any other circumstances and its use in this connection is questionable. True cedar oil, or cinnamon, or oil of cassia placed in the pulp chamber or the large portion of the canals with vaseline placed over it and the tooth left unsealed or with a vent, for a few days or a week, will accomplish the same results and without endangering the life of the tissue beyond the end of the root. We wash out pulpless teeth that have contained putrescent pulp, with bichlorid of mercury 1 to 1000, made with peroxid of hydrogen or with Ash's solution, and after thoroughly cleansing, pack with cotton dressing saturated with eugenol ninety per cent, thymol ten per cent. In case of abscess of any character, an external opening must be made through the soft tissues to the seat of infection and Ash's solution, or Dakin's solution, or agents of that character, used to irrigate and cleanse the parts. The root must be filled before the fistulous opening is permitted to heal.

Another college reports, "In the treatment of a putrescent pulp, dichloramine-T is preferred. Sterilization of an infected pulp is accomplished by using an alcoholic solution of crystal violet and brilliant green. The student is instructed in the use of formocresol, and the silver oxid method as outlined by Dr. Howe. The Dakin solution is not used for obvious reasons."

Another school reports using the following technic for putrescent teeth: "Adjust the dam, paint all teeth included in the dam with Sandarac varnish, which should be done every time a tooth is treated. Open the pulp chamber and flood it with about a ten per cent solution of silver nitrate, allow to stand for five minutes to allow for capillary attraction to carry the silver nitrate to the ends of the roots. Remove excess from the pulp chamber with cotton and seal with temporary stopping covered with temporary cement. This may be left for as long as two weeks. CAUTION: Do not force medicine by careless pressure with temporary stopping. Have an X-ray film made. If the X-ray shows no apical involvement and there are no other symptoms proceed with the treatment. Apply the dam as previously, remove contents of the pulp chamber and root canals and with Kerr files, ream out the canals, being sure that they are opened their entire length. Put in diagnostic wires and have radiograph taken to check up work. Dry the canals and the tooth is ready for the silver reduction. With a pair of pliers place a drop or two of the silver nitrate, solution into the pulp chamber and allow to stand for seven minutes. The same amount of the formalin solution is now placed into the pulp chamber and allowed to stand for three minutes. The excess is now taken up with absorbent points. This operation is repeated three times to insure a thick coating of silver and to be sure that the silver reduction is carried to the ends of the roots and all other openings. The silver nitrate solution is placed in the canals first and also last, making use of the silver nitrate, in the complete operation, four times, and the formalin solution three times. The canals are now thoroughly dried and the lubricant pumped into the canals to receive the gutta-percha points. These are placed in the canals in sections, the smallest end first and so on, forcing each piece into place so as to expel all the lubricant possible until the canals are filled. For anterior teeth, silver nitrate omitted. Contents of the pulp chamber removed and a dressing of fresh solution dichloramine-T placed therein. The next day the root canals are opened up and dressing placed in canals. Repeat four successive days. The canal is filled in the usual way and no silver nitrate used on these teeth."

Referring to the use of formalin in putrid canals, another report adds: "We use graded solutions of formalin in creosote and in the apical portion of the root canal the formalin concentration is never more than five per cent."

Another college clinic reports, "Dakin's solution preferred, as it is found non-irritating and efficient. Formocresol is used in some cases."

Four schools reported having discontinued the use of formocresol altogether. All agreed upon gutta-percha as the best root canal filling known today, the majority using it in conjunction with chloroform; about one-third using the Callahan method, the remainder being about equally divided between eucapercha and silver reduction in conjunction with gutta-percha.

Replies as to "What per cent of teeth showing chronic abscess do you attempt to save" were, as a few examples, as follows:

1. "None."
2. "Very few."
3. "Five per cent to ten per cent and most of these for people under twenty-five years of age. Most of the treatments are on single-rooted teeth, or lower molars."
4. "Fifteen per cent to twenty per cent. Patient takes the responsibility and is fully informed as to possible results."
5. "Very small per cent, and only those that have not had peridental membrane destroyed."
6. "Not more than twenty-five per cent. All root canal operations are checked up by means of radiograph."
7. "Not to exceed ten per cent."
8. "All those which show any possibility of being amenable to treatment except in cases of marked constitutional symptoms."
9. "Practically none—nearly all such cases are consigned to the forceps and curet."
10. "Try to save only the six anterior teeth and under certain conditions, the bicuspid."
11. "We advise extraction in all cases where the apex of the root appears to be denuded in radiograph. All teeth are radiographed prior to treatment and after canals are filled—both clean and putrescent cases."
12. "Percentage hard to determine. If a case does not yield to treatment after two or three treatments, we extract the tooth."
13. "All that respond to treatment—checked up by X-ray."
14. "Depends entirely upon the extent of destruction of the attachment of the peridental membrane from the cementum."
15. "Not possible to estimate. Treatments based on history and patient's physical condition, and extent of bone destruction."
16. "We attempt to treat those cases in which the infection has not progressed beyond the stage of chronic proliferating pericementitis and this only in the absence of definite systemic manifestations."
17. One school reported that they attempted to save about ninety per cent. With this single exception, all others reported percentages under forty.

These returns indicate that the dental teaching institutions are teaching:

1. A conservative policy regarding the salvation of pulpless teeth.
2. The importance and necessity of developing an ability to make:
(a) a fine discrimination in differentiating between savable and unsavable teeth; (b) a more thorough diagnosis involving factors relative to general physical conditions, susceptibility and age of patient, mechanical accessibility to root canals, all bearing a relation to a favorable or unfavorable prognosis in treatment.

3. The use of the X-ray as an aid in diagnosis and to check up root canal filling.
4. A careful discrimination in the use of arsenic.
5. Substitution of non-irritating agents for those of an irritating character wherever possible.
6. A more exacting technic, including cleanliness and surgical asepsis.

The great publicity given to the world of the menace to humanity of pulpless teeth and their resultant sequelae involving a reflection of inefficiency in the dental profession spurred the profession to an effort to correct the wrong. In this effort, scientific progress is being made and when it has reached a sufficient degree of perfection, it will have been an achievement than which there can be none greater in the realm of dentistry.

A LIST OF BOOKS PUBLISHED IN THE LAST YEAR COVERING VARIOUS SUBJECTS IN DENTAL SCIENCE

1. "Periodontal Disease and its Treatment by Ionic Medication."—By Ernest Sturridge L.D.S.-D.D.S.
2. "A Textbook of Dental Pathology and Therapeutics for Students and Practitioners."—Work of Henry H. Burchard, M.D., D.D.S. revised and rewritten by Otto E. Inglis, D.D.S. Sixth Edition.
3. "A Practical Root-Canal Technic."—By Arthur Barton Crane, D.D.S., Washington, D. C.
4. "Porcelain Dental Restorations", with a chapter on Gold Inlays.—By William A. Capon, D.D.S.
5. "A Practical Treatise on Artificial Crown, Bridge and Porcelain Work."—By George Evans, D.D.D., F.A.A.D.S.—8th edition.
6. "Index of the Periodical Dental Literature" published in the English Language, Including Sixty-five Publications in England, Scotland, Canada, Australia, New Zealand and the United States for the five years, 1911-1915. A Classified Subject Index on the plan of the Dewey Decimal Classification. An Alphabetical Author Index; A List of Dental Books published during the same period, compiled by Arthur D. Black, A.M., M.D., D.D.S., Sc.D., Dean, Northwestern Dental School, Published by the Dental Index Bureau under the auspices of the American Institute of Dental Teachers, 1921.
7. The Microscopic Anatomy of the Teeth".—By J. Howard Mummery, Sc.D., London.
8. "The American Year Book of Anesthesia & Analgesia 1917-18."—By F. H. McMechan, M. D.
9. "Oral Anesthesia-Local Anesthesia in the Oral Cavity."—By Kurt H. Thoma, D. M. D. Boston, Second Edition Revised.
10. "Practical Orthodontia."—By Martin Dewey, D.D.S., M.D., Fourth Edition.
11. "War Surgery of the Face—A Treatise on Plastic Restoration After Facial Injury."—By John A. Roberts, A.M., M.D., F.A.C.S.
12. "Dental Surgery and Pathology"—By J. F. Colyer, F.R.C.S., L.D.S., 4th Edition.
13. "A Practical Treatise on Fractures and Dislocations of the Jaws."—By Chalmers J. Lyons, D.D.Sc.
14. "General and Dental Pathology."—By Julio Endlemen, M.S., D.D.S., and A. F. Wagner, A. M., M.D.

THE PSYCHOLOGICAL LAW OF ANESTHESIA

BY BERNARD FELDMAN, D.D.S., PATERSON, N. J.

(Written for THE DENTAL SUMMARY)

(While not necessarily endorsing any of the deductions of the author of this series, the Editor and publishers believe that, in the interest of the advancement of science, the work of all sincere investigators is deserving of consideration by the largest possible group of intelligent men and women. It is in this spirit that space is devoted to these articles by Dr. Feldman, even though they may be considered by some as rather remotely related to dentistry.—G. E. H.)

(Continued from page 257 MARCH DENTAL SUMMARY)

19

THE MECHANISM OF CONSCIOUSNESS

We now have the complete mechanism which is employed in the inhibition of pain and the loss of consciousness. It involves:

First, the Infinite Mind which governs all manifestations in Nature, however minute or grand.

Second, the human soul, or that part of the higher self, that contains the true seat of consciousness.

Third, the nerve aura, or that electrical, super-physical force which forms the connecting link between the psychical forces of nature with the corresponding forces that are contained in the nerves of the human body.

Fourth, the subconscious mind of man, which is entrusted with the control of not only this one vital process called anesthesia, but *all* such vital processes that are vital to the continuance of life, such as secretion, circulation, etc.

Fifth, the nerve-cells of the body which have been assigned by Nature to convey all such impulses emanating from Mind when the dendrites are in their normal, interfilamentary connection with each other. By breaking this connection, we shut off all such impulses.

Sixth, the brain, which receives these impulses, arranges that they are carried to any part or parts of the body.

It is not advisable to venture into other branches of the human economy that may play an important part in the defensive power and vital resistance of man; the mechanism—as complete as we have presented it,—is sufficient to cover all the factors connected with anesthesia, physical or psychical. While the physical body lies apparently unconscious, the psychical self must be conscious, on a different plane in a different way, so to say, for there is life unmistakably present. As long as the electrical thread that connects the two is not severed, completely separating Soul and Spirit from the body, resuscitation is possible. It is all a simple matter of *harmonious vibration*; for man, by casting off the trammels of his gross material body, can enter upon the next stage of his existence with enlarged powers and quickened vitality. The more exhausted the body is, the freer is the spiritual man, and the clearer becomes the spiritual perceptions.

The only thing that is necessary to understand is that the ego has the

power of having its faculties vibrating in the finer etheric media which, occultists claim, exist in nature. Perhaps the time is not very distant when other scientists will join the occultists in tracing the vital force as it radiates from its source, sustaining all life on every planet. Sweeping down to their polar opposites through the forty-nine stages of manifestation, these rays of the ONE intelligent and omnipresent WILL, pervade all nature, and are collectively known as the GREAT BREATH, God, etc. Such finer etheric vibrations are sometimes "caught" by the subconscious mind, and conveyed to the physical brain by means of the sympathetic nervous system, especially by way of the solar-plexus—the most important plexus in that system as regards communication with the inner Self. The nerve aura registers the vibrations, and conveys them whenever the connection is in perfect working order, finally reaching the nerves, which are but strings of electrical atoms delegated to carry mind and to exchange mind wherever placed.

The Higher Self, with its higher consciousness, is at all times, *the master*, and matter in whatever shape or form the anesthetizing stimulus may assume, is *the subject*. We have repeatedly mentioned that all forces *are matter in one of many states*. It is the transforming of energies which is the building of life. Any kind of force is simply the passage or state of motion into another state of the same; of chemical energy into electricity or heat; of heat into sound, etc. They all have their origin in the Vital Principle, which is a portion of the ONE, of the Causeless Cause. Without such a Power, the whole Cosmos would seem but a soulless corpse, instead of full of glorious, vibrant Life that permeates every atom.

As Thos. A. Edison expresses it: "About and through everything there is the play of an Eternal Mind."

20

MAN'S EVOLUTION—WHENCE HIS INTELLIGENCE?

We reaffirm that Man's Spiritual Self is the God-essence in him which links him with the Divine and makes of him a God, encased in an animal body. It is the Mind attribute which makes him distinctly human; he never was of the animal kingdom proper and never will be. Possessing this spark of the divine eternal Spirit Force, he is not a created, an endowed, a controlled and limited being. He is a creator, himself; and through his Ego, he manifests this divine *intelligence* by means of the vital principle, which works through his etheric double, to finally reach the outer husk, or his physical encasement. It is the metaphysical man that sees, and feels, and suffers; the physical is only the field on which and in which the action occurs.

Man lives, moves and has his being in the inexhaustible supply of this God-essence, this Spirit-Force, or Cosmic Intelligence. By using the organs of his subconscious mind, (its possibilities are endless, and the surface has hardly been scratched), Man has obtained dominion over all animals, and he is slowly mastering the other kingdoms of Nature. If one realizes how much of the brain, a later addition to the parent stem, is still virgin soil,

awaiting for man to use in full measure, one begins to realize the wonders and the glory of the Real Self. How much of the cerebral parts, the convolutions, etc., have never been used, scientists are astounded to learn! And Man's evolution will not be complete until he does fully utilize his subconscious mind, tempered and rationalized by his yet-to-be unfolded cerebral faculties.

We cannot be satisfied therefore with the theories now accepted by Science, the two most known being Darwin's and Haeckel's. Since Haeckel's forged plates were publicly exposed, his moneron animal-evolving monstrosity which he claimed for Man's ancestors, is no longer receiving the world-wide recognition that was once accorded to it. As to Darwin, he never really claimed that Man was descended from an ape, although this is the general conception of it. The truth of man's evolution will some day be forthcoming, hastened by the intuitive knowledge possessed by many Souls who feel their Oneness with the Infinite Mind. Until some better proof is afforded to us, we prefer to belong to this class who believe in our divine heritage, whose forbears were the Divine Intelligences mentioned in Genesis as the Bnei-Elohim, the Sons of God. There are other records, hoary with age though they be, that are still extant, records in script and in stone, which uniformly and unanimously confirm Man's divine co-partnership. We believe that we are Pilgrims who are purifying our souls through aeons of time in order to become spiritually fit and deserving to become finally re-absorbed into the All-Spirit, from whence we were started on our pilgrimage through the Rounds. Our immortal Self may pass through endless transitions; "the Self never was not; nor shall that Self ever cease to be." There is an unceasing becoming, for there is a progressive development of everything, worlds as well as atoms. "The only changeless thing is the Law of change."

As Thos. A. Edison says, "Every cell in us thinks." Modern science has proved that intelligence is not confined to the brain cells, but that we think as a whole, that all the cell-life takes part in the thinking process. (See foot-note 7.) Each cell is endowed with intelligence and has a consciousness of its own; each cell is an entity or little self, and we are made up of billions of these little selves or cells. *The Ego is the Master-Spirit* or

Foot note No. 7—"If a drop of acid is placed on the lower surface of the thigh of a frog after its head has been cut off, the decapitated frog will rub off the drop of acid with the upper surface of the foot on the same leg. Scientists have cut off this foot after the head was cut off, and the headless animal, after trying time and again to rub off the acid with the same foot as before, will finally use the foot on the other leg and continue until it succeeds in rubbing off the acid.

"Here we certainly have proof of intelligence combined with harmonious contractions in order to bring about certain definite results. It is a proof that an intelligent mind acts without a brain.

"That there is intelligence in the cells generally is proved in the case of the deaf, dumb, and blind. In their efforts at self-expression, these people have developed the intelligence of the finger tips to such an extent, that gray matter cells, similar to those in the brain, have been found there. In other words, gray brain cells are developed in the finger tips of the blind."—(Dr. O. S. Marden—"Thinking All Over.")

leader of all the cells of the body; they stand ready and willing to carry out the Ego's commands and desires. It can think health into the cells, or it can think disease; in fact, whatever thought the Ego sends out will stamp itself on every cell in the body. Mental depression is felt in the remotest cells; on the other hand, the upbuilding faith and confidence and hope, refresh and renew the entire body.

This force or intelligence is an indestructible part of the cell-life itself, and is the great cosmic intelligence everywhere present. It is Life itself, and we cannot imagine it absent from any molecule, atom or electron in existence.

It seems self-evident that *an intelligence outside the brain* must keep up the heart beats and the breathing while the brain is unconscious. Science has been forced to call this intelligence, *the Ego*, for how else could such a rational, *thinking* individuality be accounted for, let alone its countless powers and manifestations?

21

THE LAW OF ANESTHESIA.

We maintain that we have presented bona-fide facts which prove the detachment of the etheric body is possible, while it is yet clothed by the physical, and which is revealed by the action of anesthetics. As this etheric double has been photographed, its existence cannot be longer denied. French psychic scientists have been honored by their government for their experiments with this etheric double, the exteriorization of the senses, and the accumulation and *measuring* of the psychic force. Enough has been said about the intelligence that belongs, not to the brain, but to the Inner Self—nicknamed the Ego by official science, and officially accepted.

We therefore feel at liberty to present the following conclusions based upon these facts, ending with a general law that governs anesthesia in every form:

1. Surgical anesthesia illustrates but one of the several methods by which the Infinite Mind has furnished the cell-organism with the power of self protection when placed in danger. This instinct of self-preservation, Nature's first law, includes the rest and recuperation required by the cells, and enables them to get these respites, when weakened by sickness or fatigue. This relief is afforded either by normal sleep or by surgical interference.

2. This Instinct constitutes one of the vital functions of life, and manifests itself particularly when the body is placed in danger of death. Thereupon, the psychic nature of man becomes paramount, and the vehicle of instinctive response comes into immediate action. This is the subconscious mind, which assumes control of the body through the Ego. The Higher Self contains the true seat of consciousness, and dominates the lower consciousness. It is never asleep, but ever alert in its constant vigilance. While active all the time, it becomes most active when this lower con-

sciousness is asleep, normally or artificially during which time the Ego has left its earthly tabernacle, temporarily. As long as the physiological connection is intact, the Ego will return to the body upon awakening.

Anesthesia is an artificially induced SLEEP, and as such, it is subject to the same psychological laws. It is one of Nature's instinctive endowments or provisions which enables man to surgically or physically restore any unbalanced or diseased condition of the cells, without pain to the patient; and this may be brought about through one or both of man's two channels, i. e., the physical or psychological. The different physical means that are employed to induce the subjective state of mind may cause different physical effects in the organism; but the same psychic change eventually takes place in the nerve-cells (i. e., retraction of the dendrites) to render the objective senses temporarily inert. Such displacement of consciousness must not be considered to be an entire loss of consciousness, for the Higher Ego of Man never sleeps, but watches faithfully over all the life-processes and brooks no abnormal interference with them. Should such an irritant be pushed beyond a safe limit, the Higher Ego issues a tremendously significant warning in SHOCK, which is a psychic protest that the ethereal body is slowly disengaging itself from the physical body and is causing death by forcibly severing the last connecting electrical threads which hold Spirit-Soul-Body together.

22

THE RETRACTION OF THE DENDRITES

To the specific question as to what changes take place in the organism to produce the state of unconsciousness, my reply can be reproduced by quoting Dr. T. J. Hudson's own words:

*"It is the isolation of the brain cells from physical contact with each other. When the connections between brain cells are intact, the process of mentation goes on; memory combinations are made and crystallized into ideas, and we say that the brain is active—the mind is conscious—the man is awake. But when the cells are exhausted and a period of recuperation is required, the connections between the cells are withdrawn and the brain, to all intents and purpose, is resolved into its constituent elements. It is then simply a mass of unicellular organisms for the time being; an aggregation and not an organization, and as such, is incapable of thinking or an interchange of sensations as would be an equal bulk of protozoans dredged from the bottom of the ocean. The cells are at rest; the brain is asleep—unconscious. It may be comprehended in the simple formula, 'Segregation of Cells.'"*⁸

It is quite probable that knowledge of this retraction of its dendrites is transmitted by the cell to its cell-body and nucleus, and that other changes may thereupon take place in the nucleus or in other parts of the cell-body to make the isolation of the cell complete. Authorities are supposing that

there is a sub-cortical center which controls the instinct or vital necessity for sleep; and if this is so, this hypothetical sub-cortical center, which is claimed to be similar to the centers of respiration, secretion, etc., may also be involved in the phenomenon of anesthesia, which is but an artificially induced form of sleep. This sleep center may be located in the medulla oblongata.⁹ It has been frequently noted clinically, that a patient under complete anesthesia may experience sexual, secretory or other reflexes; and it leads us to infer that possibly there may be some indirect connection existing between these centers in the brain.

This cell-segregation may be produced by various agencies, either through the physical or through the psychical channels that complete the human organism.

Among the physical agencies which may cause partial or complete inhibition of the transmission of nerve-sensation by blocking off the parts, are:

1. Physical pressure; ranging from the pugilist's "knock-out punch," (the solar-plexus punch being the best known), in which there is a complete suspension of consciousness, down to prolonged pressure upon nerve-terminals (Zone-therapy) which several New Englanders are using successfully.

2. Chemicals, especially among the esters of aromatic acids. (Einhorn). Used by many surgeons, such drugs vary in their degree of anesthetic power from a barely susceptible decrease in sensibility, to profound and prolonged unconsciousness.

3. Cold applications, such as ice-packs, ice-and-salt mixtures, etc., used by the older surgeons. This method was placed upon a more rational basis since 1886, when Sir Richardson introduced his ether-spray.

4. Electrical stimulus; which Lillie claims can and does produce a pronounced anesthetic effect, and causes death when pushed to greater lengths. This is an efficient way which some states employ to speed murderers on their own journey "West." Who can prophesy that medical science may yet some day so regulate this type of anesthesia to supplant the present narcotizing methods?

Among the psychical manifestations, may be mentioned:

1. Pronounced subjectivity of the mind in wide-awake people; this is seen in the soldier or fighter in the heat of action.

2. Normal sleep; it has been noted that a sleeper's foot was burned to a cinder without pain to the sleeper.

3. Abnormal sleep; such as somnambulism and catalepsy; in the latter, there may be such total suspension of consciousness as to defy detection from death.

4. Self-induced hypnosis, or a condition like the Yogis can produce at will and then they can unflinchingly bear the worst tortures.

5. Artificially induced hypnotic sleep in any one of its eight forms in which general or local anesthesia can be suggested at will.

23

FURTHER CHANGES IN THE NERVE CELLS

Certain psychic changes are produced by each one of these various agencies. These changes are *psychic* or vital in their nature, and are manifestations of the vital resistance that is part of the *life-principle* of the organism (See foot-note No. 8). These range from a mild reaction to the deeper stages known as sleep, narcosis, surgical unconsciousness and death. Any one stimulus or agent, if pushed beyond certain lengths which overcome Nature's forces, will eventually cause serious damage to the cells, and may even result in death. When the stimulus is confined to local areas, local anesthesia is produced; certain drugs cannot be thus confined, the whole body becomes affected and we have complete analgesia followed by complete unconsciousness. In these latter stages, the detachment of the ethereal body from the physical takes place *slowly, for Nature never makes sudden changes*, and the psychic factors become paramount. Before loss of consciousness can take place, this spiritual functioning of the spiritual man must manifest itself through its spiritual organ, the Ego or the Soul, and be transmitted by it to the physical instrument, which is the brain and its elaborate nerve-system. By the end-terminations or dendrites, this connection is maintained or broken; and when broken, no sensation of pain can be sent through the brain to the parts affected.

That the dendrites play such an important part in *sleep* phenomena is attested to by such authorities as Duval, Cajal, Christison, Hudson and others. Duval¹³ maintains that the connection between the cells in the cortex and the incoming impulses along the afferent paths is made by the contact of the terminal arborizations of the afferent fibers with the dendrites of the cell. Assuming that these latter processes are contractile, Duval supposes that *sleep* is caused mechanically by the retraction which results in the breaking of the connections and the withdrawing of the cells from the possibility of external stimulation. Conductivity is re-established upon reawakening by the elongation and intermingling of the processes, again re-establishing physiological connection.

Inasmuch as unconsciousness is really an induced *sleep*, and as we invariably notice that sleep precedes the general unconsciousness of anesthesia,

Foot note No. 8—Medical science has been recently very active on this important subject of man's defensive powers, or "vital resistance."

"As far back as 1903, Sajous, of Philadelphia, showed and demonstrated that the ductless glands as a group constituted the mechanism through which the body defended itself against disease, and that those of our remedies which were positively curative (other than those such as quinine and anthelmintics, which directly kill a parasite or germ) did so through the agency of the ductless glands which combined to supply the immunizing substances."—(Dr. J. M. Taylor, *Dental Cosmos*, March, 1921.)

We have briefly discussed this topic under section 4 and 5; it may prove interesting to study further the relationship which exists between the ego, the nervous system and the ductless glands.

A final discussion of the vital-force will be found in Section 25, to appear in the next installment.

we can reasonably assume that the same changes take place in the nerve-cells and the dendrites in both conditions.

To prove this contention beyond a reasonable doubt, it will be necessary to go into greater detail in the nature of sleep. Another pet theory will be overthrown before we are through. It is commonly held that the object of sleep is to secure rest for the physical body. Its real object, however, is the refreshment and the reorganization of the spiritual self. When the physical body is asleep, the spiritual man is most active and the life-principle is recharged with energy or vital force. Upon this spiritualizing with renewing strength having been obtained from the vast supply of the spiritual realms, man reawakens into his physical body and seizes his instrument to resume his daily duties.

We will then show that there are many varieties of sleep, and we will show that there is a close analogy between the different varieties. We will then be in a better position to understand the nature of chemically induced narcosis, in order that with this added knowledge and understanding of the principles involved, the reader may be able to render a *safer* and a *better* anesthesia to his patient. This is the real purpose of the paper, *ie.*: to render the administration of anesthetics less dangerous to the patient, by an operator who has a better understanding of the principles involved.

(To Be Continued.)

References:

⁸T. J. Hudson, "The Law of Mental Medicine."

⁹Hugo Munsterburg, "Psychotherapy."

¹³Howell's Text Book of Physiology.

PENETOLOGY

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This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

THE ARTISAN who does good work must have good tools to work with and accurate plans to guide him. The diagnostician and the dental practitioner are the most highly specialized artisans. Their work is both delicate and complicated and concerns a most delicate mechanism, and a most complicated machine.

Up to the advent of the X-ray and its application to medicine by William Conrad Roentgen, both medicine and dentistry were greatly in the dark relative to determining the internal structure of the bodily framework. There was no method by which the operator could be guided as to position of bony parts, when such landmarks did not protrude externally on a surface so as to be palpated or become visible. The plans for any operation or even the diagnosis of bone condition was dependent entirely on the sense of touch and the symptoms a patient described—(and location of pain and description of symptoms by patients are notably unreliable).

With the advent of the recording by X-ray picturing a means of delineating the plans—so to speak—and the recording of the internal structure of parts, particularly bone, was developed. A new means of diagnosis was made possible. A new method of planning the work of the surgeon was developed. Study is therefore now being directed to the correct interpretation of the pictures, showing the plans or structure of the frame work or body machinery.

There is no disputing the value of the information, such as can be had from a properly taken penetogram. How impossible, however, to judge the similarity or to determine the difference of structures if they be differently pictured. For that reason, and so that a common and simple practice may be encouraged, so that similar pictures, such as should show a similarity in the picturing of similar parts, may be encouraged, attention is directed to the dental areas and to such parts as should serve as guide posts or landmarks for the directing of the light rays or of the placing of the film in a good plane for the collection of the light rays.

To picture the teeth correctly and without distortion, the rules of physics which relate to shadow formation must be adhered to as closely as

possible. The observation of the rules for correct shadow formation will be the chief factor on which correct picturing will depend. (This, of course, excepts the elements of exposure and development of the film or difference in current, etc., that may be used. In the dental units the range of current used is small and the possibility of error in this direction is therefore low.) Correct picturing, from the points of actual reproduction of structure, depends upon the plane of light-force and the plane for the reception and the recording of the shadow. Where light is propelled in a direction at right angles to the receptive screen, the image reproduced by the shadow is more nearly correct in its proportions. This is the more absolute when the screen and the long axis of the object or subject are in parallel planes or nearly parallel.

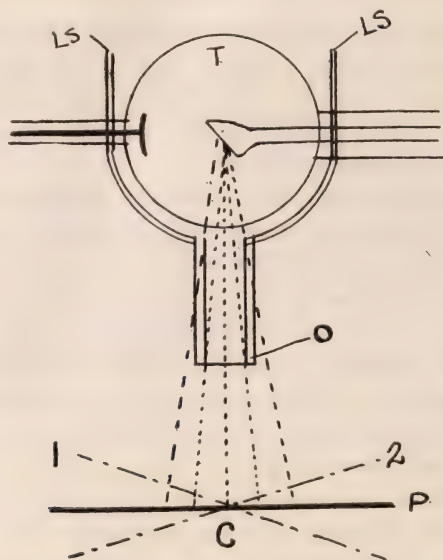


Figure 1—Indicating the directing of rays perpendicularly onto a film or plane. T represents the X-Ray tube, P the plane perpendicular to the majority of light rays, or waves. Broken lines 1 and 2 describe how a deviation from the proper plane causes a distortion of the image because of an alteration of distance.

The above chart represents a tube and the radiation of light from its target. If a screen is placed as indicated at P, there will be a greater number of rays exerting their force in a perpendicular direction than in either the positions shown as 1 or 2. By conforming to the position of preference as indicated in this arrangement, the image duplicated on a screen or film is the most correct of any combination.

Reference is now made to *Fig. 2*. Attention is directed to the plane which the two model teeth occupy and the plane of the screen. They are almost parallel. The white arrow indicates the direction of light and it will be seen that the force of light is perpendicular to the plane of the screen which is indicated by the white line to the left of the picture. The shadow can be seen in clear-cut lines, and from its shape can be recognized as that

of the two models. From the appearance of the shadow a molar model can be differentiated from a bicuspid (pre-molar). The size of the shadow also compares favorably with the size of the models. The reproduction is quite perfect.

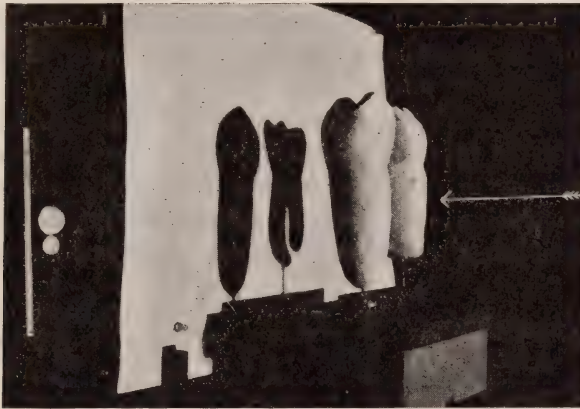


Figure 2—The models of two teeth are pictured here. Light is directed as indicated by the arrow on the right. To the left the white line indicates the plane of the screen while the white figures indicate the models. Note that the shadow seen on the screen is clearly and distinctly and equally outlined.

The same relation of force and effect is as true in the reproduction of the outlines and recording of light-force penetration on the penetogram. It calls for the same attention to the necessary details for accuracy of picturing. If the rules for accuracy are not observed the reproduction on the film is faulty, what might have shown as a land-mark or as a determining factor

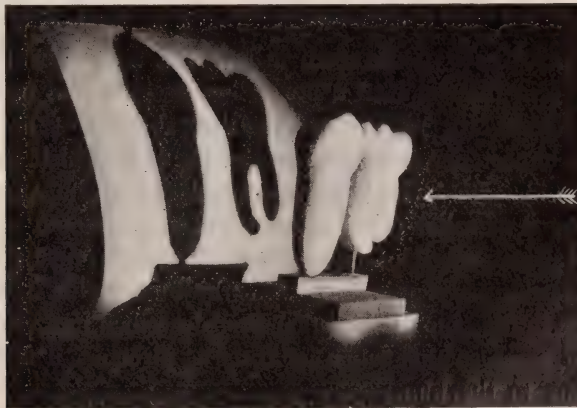


Figure 3—The models of two teeth, pictured on a screen which does not conform to the rules of a perpendicular plane. Note distortion of relative size and the indistinctness of outline away from the center of light force.

of proper or improper picturing or structural detail, might become obliterated through elongation or even hidden by being in the way of a shadow of some denser part.

Referring to *Fig. 3*, it will be noted that to deviate from the rule

of the perpendicular to the plane of the screen and the parallel plane of the object causes distortion.

The several planes of surfaces to be found in the mouth, and the different axes which teeth assume, make the placing of the film and the arranging of the direction of light-force an alterable factor. It is possible, however, to indicate an average by which the placing of films and the directing of light can be governed.

It is fallacious to attempt to govern the direction of light by the external contour of the face, though some idea of the variations in the surfaces within the mouth might be learned from such a study. The face contour and prominences only serve to indicate the position of dense bone promontories, and offers a means of directing the light-force to avoid them.

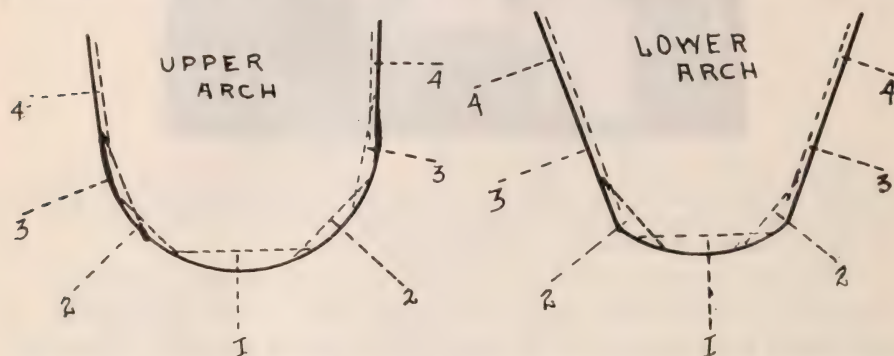


Figure 4—The two arches roughly represent the positions of the teeth in the arch of the upper and lower jaws. The broken lines within the arches represent straight planes in which films might be placed. The lines numbered as 1, 2, 3, and 4 are the positions of the centrals and laterals, the cuspids (canines), bicusps (pre-molars), and molars respectively and indicate the perpendiculars to these areas. (See Figure V.)

The crown surfaces of the teeth in both the upper and the lower jaws are more or less in the shape of a horseshoe, as indicated in the chart. In directing the X-rays for picture-making they must first be directed in a plane which is almost perpendicular to the plane in which the tooth to be pictured is located. Next the film must be placed in the mouth behind the tooth in as near a parallel plane to the axis of the tooth as possible and maintained as near as possible in one plane. The light must then be focused as nearly as possible perpendicularly onto the film. This is done by maintaining the tube in the general direction first described and elevating or lowering it in that plane so that when its force is directed, it will be in a perpendicular plane to the film.

In the chart showing the shapes of the upper and lower jaw formation, as they can be considered penetrographically, the broken lines within the arches indicate the positions for the various films, while the numbered lines indicated the general direction of light from the tube, perpendicular to the film.

By a combination of the charts shown as the upper jaw in *Fig. 4* and those shown in *Fig. 5* the relative positions for the picturing of the teeth in

the upper jaws is indicated. The centrals occupy a position as indicated at 1 in *Fig. 4* and in *Fig. 5* line 1 is indicated as perpendicular to the line L. H. The molar area on the chart is indicated as 4. This position is best found by directing the light as shown in the upper arch chart, *Fig. 4*, and then elevating it as indicated as perpendicular to the line M. H., *Fig. 5*.

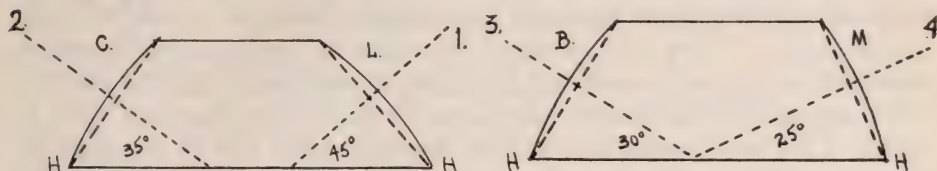


Figure 5—H-H represents a horizontal line while the various areas rising from it represent the positions of teeth of the upper jaw as L-H, Centrals, etc.

The inside of the mouth and the planes formed by the bony parts form the necessary guides for the placing of films. Within certain distances a straight plane is possible in each portion of the upper arch and such a plane is the one to be selected for the placing of a film.

In the lower jaw the axis of most of the teeth is in a plane at right angles to the plane of the biting surface or the occlusal plane. However, the promontory of the soft-tissue ridge and alveolar process does not permit of the application of a film in a plane absolutely parallel to the axis of the tooth. The film finds its position somewhat nearer the crown end of the tooth, and slightly more distant at the apical end. To compensate for the difference of the plane of the film and that of the axis of the tooth, light rays to picture teeth in the lower jaw must be directed from a plane slightly lower than the occlusal plane. The tube must therefore be in a plane lower than the horizontal plane of the teeth. From this position the rays are directed slightly upward. They are then perpendicular to the plane of the film within the mouth (*Fig. 4*.) The variation of the angularity of film positions in the lower jaw is slight, so that an arc of about 10 degrees below the horizontal to the horizontal plane would most likely describe this variation. This is from a horizontal plane to that of 10 degrees below the horizontal, using the film as the focal point, would describe the travel distance of the tube. The central incisors of the lower jaw require a greater depression of the tube than do the molars.

In the upper jaws the planes of the axes of the teeth vary in their relation to the occlusal plane to a greater extent than those of the lower jaw. The inclination to the palatine surface of the plane of the central and lateral incisors is greater than that of the canines (cuspids), pre-molars (bicuspid) or molars. The molars present an axis nearer a perpendicular to the occlusal plane than do the others. This means that the plane of the film will also be altered with the position of the tooth to be pictured. In the upper jaw the films when placed assume a position of approximately from 65 to 45 degrees from the perpendicular and therefore the range of the tube varies from 25 to 45 degrees from the horizontal.

In the illustration the horizontal represents the occlusal plane, while the arched line represents the palatine surface of the mouth. The different inclinations are indicated for the positions of the different teeth. The straight broken line behind each arched inclination represents the position of the film and the dotted line perpendicular to it the direction of light-force. It is infrequent that a greater range of angularity need be considered in a normal mouth. There is no means of estimating the variations which would or might be required in some of the types of extremely irregular mouths which are seen. The general rule to place a film in one plane and have it assume a position as near a parallel as possible to the axis of the tooth in question, and directing the rays at right angles to the film will give the greater proportion of clear and most easily interpreted pictures of any method used.

In further explanation of the placing of a film in the upper jaw and the directing of light-force, the reader is directed to the chart of the upper arch. Area marked 1 indicates the central and lateral areas, number 2 is the cuspid or canine area, while 3 and 4 are the bicuspid or pre-molar and the molar areas respectively. The area to be pictured is determined and a film is placed in the plane position which the tooth designates, and the tube of the machine is then directed perpendicularly at the film over the area as indicated. Referring now to the two charts of elevations and angles it will be seen that the broken lines are numbered to correspond with those of the

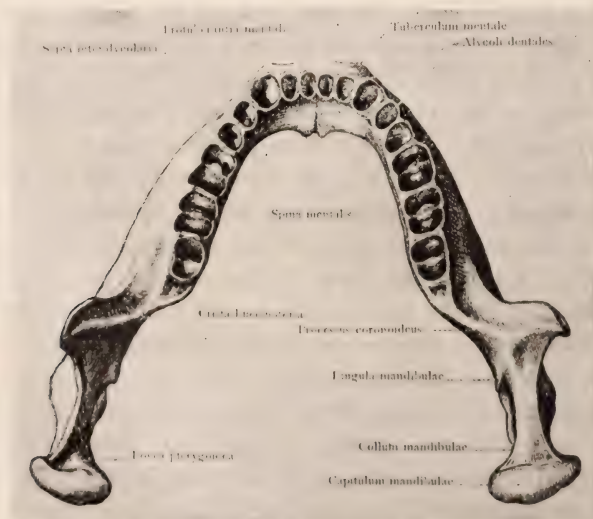


Figure 6—(From Toldt's Atlas) The lower jaw with teeth removed showing axis of tooth sockets and indicating positions for films as well as promontories mentioned in text.

upper arch positions, so that when the position is assumed as to tooth area the tube should be elevated according to the corresponding number shown in the chart of elevations and angles. (These elevations and angles are not

absolute but are approximate and sufficiently correct to produce good diagnostic pictures in the average case.)

Anatomically there are found several promontories and areas about the head which offer a variation in the resistance to the peneto-rays which can be considered as land-marks in the interpretation or diagnosis of a penetogram. After learning the appearance of the normal from the correct angles, the discovery of the abnormal is a matter of comparison and can be easily recognized.

In the lower jaw, beginning at the median line, there are two bone spines to be found situated on the inner surface a little above the base of the mandible. These spines are composed of heavy bone substance. Their position and appearance on a film is typical and serve as a means for the determination of position of teeth in relation to this fixed point. In a position about the apex of either the first or second bicuspid (pre-molar) there will be found the mental foramen. As this foramen is located in the outer table of bone its position on the films will be found to vary with the point from which the light-force is directed. It may be between the apices of the two bicuspids (pre-molars) or about the apex of the second bicuspid (pre-molar). It is rarely seen about the apex of the first bicuspid (pre-molar). These variations result in great part from a normal variation in the position of the foramina itself and the thickness of the lower jaw bone, and secondarily from the directing of the light-force from a point too far forward or too far backward from the actual position of

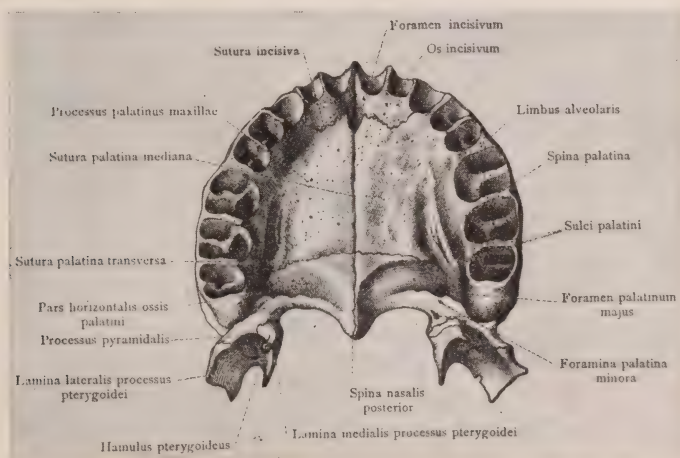


Figure 7—(From Toldt's Atlas) Upper jaw with teeth removed. Compare positions with those of lower jaw as shown in Figure VI.

the opening. This fixed area of lessened resistance must often be differentiated from some pathological condition. Its appearance, however, is a characteristic and a definite land-mark. From this point back there may be traced the inferior dental canal. This canal is bordered by a wall of

heavier bone which is represented in the mylohyoid line internally, and the oblique line externally.

The upper jaw represents land-marks and points of special attention in a similar manner. In the median line, the intermaxillary suture is more pronounced in the upper jaw than in the lower. It is often pictured and may be mistaken for some pathological condition. At the floor of the nose and the base of the nasal septum there is a bony spine which protrudes forward. This is the anterior nasal spine. It is composed of bone of denser character than alveolar process and plays an important role in pictures of the edentulous jaw in this position. On the palatine surface, just back of the central incisor teeth, there is a spear-shaped space in which are found the incisor foramina. Penetration through this area is easier than elsewhere about the alveolar process in this area. The teeth, and particularly the apices of the central incisors, are often projected into this space and some pathology may be suspected, if its location and anatomical significance is not understood. The antrum of Highmore or maxillary sinus is situated in the maxilla, occupying a position from behind and above the cuspid (canine) to the full extent of the maxilla backward (*Fig. 8*). The most dependent point of the floor of this sinus is usually in the position of the second molar teeth, and most often behind the zygomatic process of the maxilla. From this point forward the floor of the antrum rises, in some instances more and in others less. It is seldom that it is in close proximity to the root of the canine tooth, yet the forwardmost

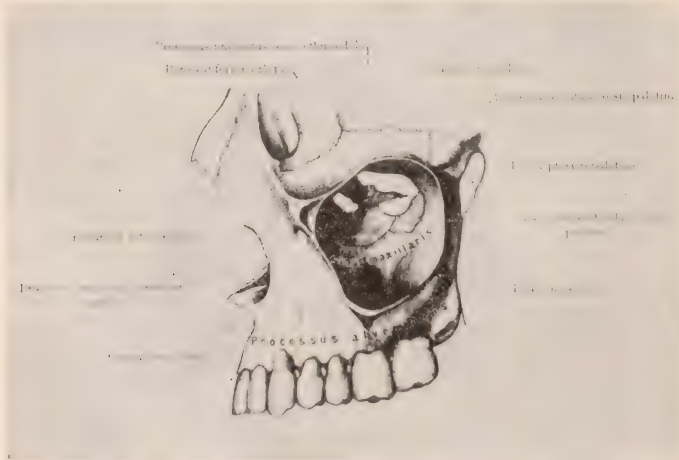


Figure 8—(From Toldt's Atlas) Position of the maxillary sinus and relation of teeth nicely shown. Note position of walls in reference to light force impulse.

fossa of the maxillary sinus is situated over the apex of that tooth. In picturing canine teeth care must be exercised to differentiate the canine fossa of the maxillary sinus from a pathological process. The sinus is a bone space and therefore of easier penetrability than is the alveolar process, or an equally extensive mass of bone.

Externally the maxilla is the most prominent at the position of the zygomatic process. This indicates the position of the second molar tooth and this fact controls the picturing of this tooth because the zygoma arches over the teeth from that position backward. If the light-force is directed from a point too far back the heavy bone of the zygoma is projected over the teeth and makes the detail of the area indistinct. The second molar is best pictured through the antrum from its position in the malar bone.

In the area of the third molars of the upper jaw there is often pictured the coronoid process of the ramus of the lower jaw. The exact position of the projection of this process onto a film varies because of the differences which this point assumes in shape and position and normal anatomical relation. It may also vary because of the extent to which the jaws are separated to place a film in position. The opening of the jaws forces the coronoid process downward and forward and it is therefore often brought into the field being pictured.

The several fixed and prominent anatomical points serve as land-marks and aid in the determining of the normal position in relation of teeth to promontories, canals, foramina and sinuses. They also fix the relation of other anatomical parts, such as may require interpretation.

The prime essential to the correct diagnosis of a dental penetrogram is a correct interpretation. There is no possibility of the making of a correct interpretation without the knowledge of such of the fixed anatomical parts as may be seen and the difference in appearance they may assume on a variation of position. Through an elongation in the picturing of a field a promontory may be projected beyond the point of its normal position and assume pathological significance unless correctly interpreted. By the foreshortening in picturing the error of condensation may accentuate certain lines and make prominent some points which exist normally, and cause them to assume the appearance resembling pathological conditions. The correct interpretation of the picture as an expression of a greater or a lesser penetration for light-force than should be the normal expression and appearance for a definite area precedes the making of a diagnosis. The recognition of the position of the teeth as well as any alterations in the appearance of the various anatomical land-marks demands strict attention. Whatever variation is pictured must be interpreted first as a normal or an abnormal appearance.

It is fallacy to attempt to diagnose a picture before interpreting the meaning, or the position, or the relation of the component parts of the picture. The best way to make such determinations and interpretation is by an accurate knowledge of shadows and shadow values as well as their normal positions, locations and extent. The understanding of what terms of penetration mean and how they are pictured or represented, are essential to an interpretation. The diagnosis, in part, entails the determination of whether positions and extent of each area as pictured is a representation of the normal or not.

For the purpose of diagnosis or even proper interpretation a vast number of pictures of a variety of normal conditions, expressed under varying methods, must be studied. From the anatomical differences noted much can be learned. The orthodontist requires the positions of teeth and for him that constitutes a diagnosis. The general practitioner in dentistry, however, must do more. He must correlate the anatomical differences, in the changes in shadow grades as they are expressed, and the symptoms described clinically, before he can attempt a diagnosis.

Close attention is therefore directed to each of the articles of this series for in them will be found a definite method by which better diagnosis of the dental penetogram can be arrived at. The subject is too broad to be covered in a few articles, therefore this series. The most satisfactory method of instruction is, of course, personal, where terms and methods can be discussed as they come to the mind. This is impossible in text. However, any question or any mystifying points will be gladly discussed again or answered if the requests are directed to this department.

National Dental Convention

The twenty-sixth annual convention of the National Dental Association, will be held in Los Angeles, California, July 17th to 21st, 1922.

The Ambassador, one of the city's newest and largest hotels, situated in the heart of one of the most beautiful residential districts, will be convention headquarters and practically all sessions can be held in the hotel or on the grounds.

The Local Committee on Arrangements can safely state that this meeting will provide an excellent program, demonstrating that "Dentistry can add ten years to the average of human life." This committee can also safely state that our visitors will be well entertained during their sojourn in Los Angeles.

It is none too early to plan a vacation, westward, in July 1922 and to send for hotel reservations.

Watch for further and detailed announcements in all Dental Journals.

The Local Committee on Arrangements, per

C. M. BENBROOK, *General Chairman*,

707 Auditorium Bldg., Los Angeles, California.

LEGAL DEPARTMENT

CONDUCTED BY ELTON J. BUCKLEY, 643 LAND TITLE BUILDING, PHILADELPHIA, PA.

No. 658.—*Why the Victim of This Fraud Was Denied Relief.*

I have just finished reading the decision of a court in a case brought against a man who signed a contract without reading it. It shows better than any case I have been able to quote recently how absolutely at the mercy of circumstances a man is who puts his name to *anything* which he hasn't read.

This case shows that the law will extend almost no protection whatever to the man who gets into a hole solely because he signed something he didn't know he was signing. This applies to cases where the victim read the contract, but didn't see or understand the provision which got him into trouble, and it particularly applies to cases where the victim didn't take the trouble to read it.

The victim in the case in question was a man whose business had nothing to do with talking machines, but who was persuaded by a salesman one day that he could make some money out of talking machines as a side line. After the victim was sold, the question of a contract arose. The salesman had it all ready, and as the merchant was busy, he asked the salesman to read the contract to him. The salesman did so, but purposely omitted to read Paragraphs 6 and 17. Part of the printed contract consisted of five promissory note forms. Paragraph 17, omitted, provided that the merchant should pay these without defense. Paragraph 6, omitted, provided that the money so paid should be returned with interest in fifteen months if the merchant hadn't sold twenty-six machines.

The scheme had been represented to this merchant as a pure venture in which he had everything to gain and nothing to lose; in which if he sold some machines he made some profit, but if he sold none he made no loss. In reality, the two paragraphs which the salesman omitted, and the promissory notes, made it a valid binding contract for twenty-six talking machines.

The merchant signed the contract, and in due time was faced with a demand for payment on five notes aggregating a large sum. He defended on the ground that the whole scheme was a rank fraud, which it certainly was, yet the court gave judgment against him. That seems outrageous to some, no doubt, but when you hear the court's reasoning, you may look at it differently. The court decided the case on the ground that if the merchant had exercised the proper vigilance he need not have

been taken in. This is from the decision:—

The defendant admits giving notes, but resists payment of them because, as he alleges, they were fraudulently obtained from him by an agent for the plaintiff. The facts upon which he relies to show fraud are as follows: On or about February 25th, H. M. Marx, an agent of plaintiff (Serenado Manufacturing Co.) called upon him and stated that he had an interesting proposition in talking machines. Defendant being engaged at the time, asked the said H. M. Marx to read the contract which he, Marx, proposed the defendant should enter into with plaintiff company. The agent then read all the contract except Paragraph 16 and Paragraph 17, and told the defendant to sign the same. The five promissory notes were attached to it and signed at the same time. He also alleged that the notes were signed without being dated and at the time of the signing of the same, said agent told the defendant that the said notes were not to be negotiated unless defendant failed to comply with his part of the contract. The defendant admits the signing of the contract. The sixteenth paragraph of it is: "It is mutually agreed between the parties hereto that this instrument contains the entire agreement covering this transaction." This was read to him, and he does not deny that he knew it was in the contract. * * * * *

The defendant does not allege that he was unable to read, or that he was prevented from reading the contract by any act of the plaintiff's agent. There are numerous cases that decide that where a party cannot read, or was prevented from reading a contract, he may show by parol (verbal) evidence that it was not read to him. and that its contents were misrepresented to him by the other party at or before it was signed, when the defendant in this case, who does not allege that he cannot read, or that he was prevented from reading signed this contract, it was his solemn agreement, and cannot be changed or varied by anything that was said or done at or before its execution. He admits that the paragraph which says that the written contract contains the whole of the agreement between the parties to it was read to him, or at least does not deny that it was. So that he cannot avoid liability on the notes because of anything that the agent of the plaintiff said about their not being

negotiated. He agreed in signing the contract that it contained the whole agreement between the plaintiff and himself, and permitted it to be sent to the plaintiff for approval on that condition.

We do not think that it makes any difference to the defendant in this proceeding that the two paragraphs referred to were not read to him, as there is nothing in them to show that the defendant was not to pay the notes when they came due. If they were omitted from the contract entirely the defendant would not be relieved from paying them.

In other words, the single fact that the merchant not read the contract, when he could have done so, is assumed by the court to have

been the sole cause of all his troubles. He was meanly taken in by a crafty and well-prepared fraud, yet the law would not help him because at the proper time he did not help himself. After all, isn't that simply another version of "as ye sow, so must ye reap"?

A client said to me recently, "I never sign *anything* without either reading it or having it read to me." If it is read to you by somebody of your own, whom you can trust, that may be all right, but *having it read by the man who is asking you to sign it* may be as bad as not having it read it all.

(Copyright, February, 1922, by Elton J. Buckley, 643 Land Title Building, Philadelphia, Pa.)

If half the ingenuity spent in finding excuses for not doing what we ought to do were exercised in finding means to do what ought to be done, there would be a blessed difference.—Exchange.

SOCIETY ANNOUNCEMENTS

Pennsylvania State Board

The Pennsylvania Board of Dental Examiners will hold an examination for applicants for a license to practice dentistry, in Pittsburgh and Philadelphia on Wednesday, Thursday, Friday and Saturday, June 21, 22, 23 and 24.

The theoretical examinations will begin on Wednesday, June 21, and will be held in the Musical Fund Hall, 808 Locust Street, Philadelphia, and the College of Pharmacy Building, Pride and Bluff Streets, Pittsburgh.

The practical examinations will be held on Saturday, June 24, in the Evans Institute, 40th and Spruce Streets, Philadelphia, and the University of Pittsburgh, Pittsburgh. The operative work will start at 8:30 A. M. and the prosthetic work at 1:30 P. M.

A partial examination will be held for students who have finished the work of the second year in college, on Wednesday and Thursday, June 21 and 22, in the same places. No others except second year students are eligible for the partial examination.

An examination will also be held for dental hygienists on Thursday, Friday and Saturday, June 22, 23 and 24. Only hygienists who have four years high school preliminaries are eligible for this examination.

Application papers may be secured from the Department of Public Instruction, Harrisburg. Any further information may be secured from

ALEXANDER H. REYNOLDS, *Secretary*,
4630 Chester Avenue, Philadelphia.

New York State Dental Hygienists Association

The second annual meeting will be held at Rochester Dental Dispensary, Rochester, N. Y., May 12 and 13.

Friday morning, May 12th, at 9:30, a meeting of the Executive Board will be held. Following this, a luncheon will be served.

At 2 o'clock there will be a business session for members only, after which short talks will be given by Miss Mabel French, D. H., of Philadelphia; Miss Verna Thornhill, D. H., Instructor of Oral Hygiene in Public Health Service; and Miss Mary B. Knight, D. H., in charge of Child Welfare Work in Delaware.

Friday evening, at 8 o'clock, the Dental Society has invited all the Hygienists to attend a lecture on "Modern Conception of Infection," by Dr. Weston A. Price, of Cleveland.

Saturday morning, at 9 o'clock, clinics will be held at Convention Hall

in conjunction with the clinics of the Dental Society. Clinicians from the Columbia School of Dental Hygiene and the Rochester School of Dental Hygiene will demonstrate. There will be nine chair clinics, several of which will show Hospital work on bed patients, others Red Cross, State and Institutional Work, General Office Prophylaxis, Child and Orthodontia Hygiene.

At 3:00 P. M. at the Rochester Dental Dispensary, a reception and tea, followed by dancing, will be given by the Alumnae of the Rochester School of Dental Hygiene and Class of 1922.

Saturday evening, at 8:00 o'clock, a public meeting will be given in the main clinic room of the Dispensary. Speakers to be announced later.

MAIDA M. FOERY, *Chairman Publicity Committee.*

Illinois State

The 58th Annual Meeting of the Illinois State Dental Society will be held in Springfield, Illinois, May 9th, 10th and 11th, 1922.

The officers of the Society are as follows: President, Dr. Frederick B. Noyes, Peoples Gas Bldg., Chicago, Ill.; Vice-President, Dr. R. H. Daniels, 909 Lehman Bldg., Peoria, Ill.; President-Elect, Dr. E. F. Hazell, 608 E. Capitol Ave., Springfield, Ill.; Secretary, Dr. Arthur G. Smith, 511 Central National Bank Bldg., Peoria, Ill.; Treasurer, Dr. T. L. Grisamore, 29 E. Madison St., Chicago, Ill.; Librarian, Dr. T. E. Turner, 25 E. Washington St., Chicago, Ill.

Sincerely yours,

ARTHUR G. SMITH, *Secretary.*

American Dental Library and Museum Association

The next annual meeting of the American Dental Library and Museum Association will be held Monday, July 17, at the Hotel Ambassador, Los Angeles, Calif.

The membership consists now of over forty dental libraries, and we trust that all dental institutions owning a library will join same.

In order for the Association to accomplish its purpose it will be necessary and an advantage to all dental libraries to be members. Any institution or individual interested in dental literature or history are eligible for membership.

B. W. WEINBERGER, *Secretary,*

40 East 41st Street, New York.

Colorado State Board

The next meeting of the Colorado State Board of Dental Examiners will be in Denver, Colorado, June 6, 1922.

For further information address

WM. H. FLINT, *Secretary,*

Littleton, Colo.

Alabama State Board

The Board of Dental Examiners of Alabama will meet Monday, June 19, 1922, at 9 o'clock a. m., at the Birmingham Dental College, Avenue F and 20th St., Birmingham, Ala., for the purpose of examining applicants who hold diplomas from reputable dental colleges, for certificate of qualification to practice dentistry in Alabama.

All applications, accompanied by the examination fee, must be filed with the Secretary-Treasurer at least one week previous to the examination. For further information, application blanks, etc., address

H. CLAY HASSELL, *Secretary-Treasurer*,
616 22nd Ave., Tuscaloosa, Ala.

Iowa State Dental Board

The Iowa State Board of Dental Examiners will meet for the purpose of examining candidates for a license to practice in Iowa, at Iowa City, College of Dentistry, beginning Monday, May 29th, 1922, at 9:00 A. M.

An examination for Dental Hygienists will be given.

For further information and application blanks, address,

DR. C. B. MILLER, *Secretary*,
726 Fleming Bldg., Des Moines, Ia.

Indiana State

The Indiana State Dental Association will hold its sixty-fourth annual meeting at Indianapolis, Ind., May 15, 16, 17, 18, 1922, at the Claypool Hotel. All ethical dentists are cordially invited to attend. Dr. F. L. Gravis, Martinsville, Ind., is master of exhibits.

For further information write

A. J. KIMM, *Secretary*,
704-5 Citizens Bank Bldg., Evansville, Ind.

Arkansas State Board

The Arkansas State Board of Dental Examiners will hold its regular meeting for the purpose of examining applicants June 19-20-21, 1922, Hotel Marion, Little Rock, Arkansas.

Applications may be secured by addressing the Secretary.

DR. H. J. CRUME,
Wilson Bldg., El Dorado, Arkansas.

South Dakota State

The fortieth annual session of the South Dakota State Dental Society will be held at Sioux Falls, South Dakota, May 9th, 10th, and 11th.

All members of Dental Societies in good standing are invited. Bring your N. D. A. card.

E. W. ELMEN, *Secretary*.

The American Society of Dental Radiographers

The annual meeting of the American Society of Dental Radiographers will be held at the Ambassador Hotel, Los Angeles, Calif., Wednesday and Thursday, July 19 and 20. The Program Committee has arranged for an interesting and scientific meeting. All those extremely interested in Dental Radiography are cordially invited to attend.

M. C. MCKITTRICK, *President*,

I. O. O. F. Bldg., Indianapolis, Ind.

MARTIN DEWEY, *Secretary-Treasurer*,

501 Fifth Ave., New York, N. Y.

Michigan Dental Examinations

The next examination in dentistry in this State will be held in the City of Ann Arbor, Dental College, the week of June 5th to 11th inclusive.

Application blanks, and all information relative to this examination, may be had by applying to Dr. E. O. Gillespie, 745 David Whitney Bldg., Detroit, Mich.

E. O. GILLESPIE, *Secretary*.

Massachusetts State

The fifty-eighth annual meeting will be held in Mechanics Hall, 321 Main Street, Worcester, Mass., May 2, 3, and 4, 1922.

A cordial invitation is extended to all members of recognized Dental Societies.

A. VERNON RYDER, *Secretary*,

175 Newbury St., Boston, Mass.

The Georgia State

The meeting of the Georgia State Dental Society will be held in Atlanta, Ga., June 14, 15, 16, 1922, instead of in Augusta, Ga., that date, as previously announced.

G. A. MITCHELL, *Secretary*.

OBITUARY

DR. CHARLES ELMER TENNEY

AS BRIEFLY reported last month the subject of this announcement died at his home in Toledo, at noon, on Monday, February 27, 1922, of influenza, aged 59 years 3 months and 15 days.

Dr. Tenney was born at West Milton, Ohio, November 12, 1862. After a preliminary education through the Troy, Ohio, schools, he studied dentistry at the Ohio College of Dental Surgery, practiced at Troy and Sidney, and moved to Toledo in 1910, where he has since practiced jointly with his brother, Dr. W. H. Tenney, a total of 36 years in practice.

Funeral services were held at the residence, 2628 Scottwood Avenue, and the body taken to Sidney, Ohio, for interment.

To what an extent he will be missed can be known only to those with whom he was most intimately associated—the brother with whom his professional life during the past eleven years was spent; and those near and dear to him in the family relation. To them, his place never can be filled.

From many beautiful tributes sent to the family, the following are selected as showing the esteem in which he was held:

“It is only that he has gone before us; just at the bend of the road he watches o’er us; but how we miss his courtesy, and his ever-smiling face. Other friends may be as genial, but none can ever fill his place.

“What an example was his life for his sons to fondly follow; what a loving, faithful husband in this world so hollow. How patiently he trod the road that leads to the Eternal Stillness.

“He came from a family of upright men, the type that America needs again and again, and he died, loved and honored, than which there can be no greater heritage. Sadly we miss him in our round of daily life. But he will wait for us ‘at the bend of the road,’ where the reuniting of love will be but the stronger for this brief separation.”



THE VOYAGE

"Sometimes, when the tide is low,
 I shall slip my moorings and sail,
 While against my ship's worn bow
 The sea-green waters wail.

"Like a breeze my ship of Life will pass,
 Lamented by friends on the beach;
 But sweet mem'ries will always last
 'Though their world and mine cannot reach."

—*Mary Eleanor Ball.*

Dr. Tenny was a member of the Ohio State Dental Society, of the Commerce Club, and of the Collingwood Presbyterian Church. He is survived by his wife and two sons; by his father, four brothers and two sisters.

DR. SAMUEL WATFIELD HAINES

At Ludington, Michigan, March 16, of pleural pneumonia, Dr. Samuel Watfield Haines, aged 66.

Dr. Haines was born at Wellsey, Waterloo county, Ontario, in 1856, one of a family of seven children; came to Michigan when sixteen, and made his home at Sparta, where he married Miss Frances Winn, and where he practiced his profession until four years ago when he moved to Ludington, where he has practiced since that time.

Although a resident of Ludington but a few short years, Dr. Haines had established for himself a respected place in the community and his untimely death is sincerely mourned by a wide circle of friends. He was a member of the Masonic order, a Forester and belonged to the Modern Romans. While identified with a Free Baptist church at Sparta, his old home, he chose to ally himself with the Presbyterian church of this city and with his wife and daughter was a regular attendant and devout worshipper at its services.

Left to mourn his loss are his widow, Mrs. Frances Haines; son, Hampton Winn Haines of Pittsburgh, Pa.; two daughters, Mrs. Lee E. Lampkin of Lowell, Mich., and France Lucille Haines, at home with her parents; and three grandchildren. Three brothers, George A. Haines and Arthur A. Haines of Grand Rapids and Charles W. Haines of Kent City, also survive.

DR. OSCAR F. BRITTON

At Indianapolis, January 30, Dr. Oscar F. Britton, aged 84, of pneumonia.

Dr. Britton was born at Crawfordsville, Ind., grew up and began the practice of dentistry there in 1860. He moved to Champaign, Ill., in 1861, and practiced there until 1884, when he moved to Indianapolis, where he has been in active practice for the past thirty-three years.

He is survived by a widow and a son, Charles O. Britton, a practicing lawyer of Indianapolis.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

HOLMES CLUB OF GRAND RAPIDS Digest of Proceedings of a Meeting of Interest to Dentists Everywhere.

Because of its bearing upon conditions everywhere in the United States, much space is given up this month to the following report, as printed in the lay press, of a meeting held at Grand Rapids, Mich., on February 24:

(Grand Rapids News.)

Of vital interest to every parent, every child, every industry, every private or civic enterprise—was the banquet of the E. S. Holmes Club, attended by about 75 members and a few guests. The discussion showed that the good of Grand Rapids today and in the future is of deep concern to these men who form the only city dental society, organized 10 or 12 years ago, for the purpose of promoting a city dental clinic and named for an honored member of the profession. The present officers of the Holmes Club are: President, Harry Luton; vice-president, Dr. Masselink; secretary, James Spencer; treasurer, Dr. Nelson.

The program was arranged by Dr. Gibson, an enthusiast in children's work.

The first post prandial speaker was Dr. A. H. Waller, who gave an instructive scientific paper on dental pediatrics and stressed the need of education of the public to the idea of the school dental clinic. He urged the need of diagnostic skill on the part of dental specialists in children's work, and elaborated on the importance of creating the right psychology on the part of the child. Dr. Waller said:

"The revelation of the late war statistics are startling. One-fourth of the young men between 20 and 30 years were defective for army service, and of the one-quarter of physically unfit, three-quarters were so from causes which were absolutely preventable. Only those who have had experience in examining the mouths of school children or factory workers or large groups like those who came under observation in the draft, know the health condition in the mass. The mass of people is absolutely untouched in dental hygiene. In England a committee appointed by parliament made an extensive health survey and reported that they were convinced that more than one-half of all the ills which English laboring men are subject to come from diseased teeth.

"Diet is a controlling factor in dentition. It is never too early to start. The diet of the mother during pregnancy should be regulated, as the fetus gets only what the mother eats.

In experimenting with guinea pigs and rats, good or bad teeth have been grown at will. The metabolism in pigs and rats is practically the same as in human beings. It is first necessary to build a good human being and then keep it one."

Dr. Waller cited the danger of infection from putrescent deciduous teeth; recommended capping in case of pulp exposure in broken down teeth; urged care in the use of anchor bands in case of orthodontic interference and said that orthodontia amounts to nothing without correcting nose and throat conditions. He recommended year contracts for monthly service at a stipulated fee in advance, and the keeping of complete records of each case. Dr. Barney and Dr. Locke discussed Dr. Walter's paper.

Dr. W. R. Davis, chairman of the state oral hygiene committee and head of the dental clinics of Flint, which are the best managed and most efficient of any in the country, spoke on the care of children who are not able to pay for service. He said:

"Our forefathers builded much better than they knew when they laid the foundation of the public school system. They realized that public education was an economic measure. But they passed by health education, because when the country was founded mighty little was known of scientific medicine or the causes and treatment of disease such as has been developed within a short time. If it is necessary to give an educational foundation, to even a greater extent is it necessary to give a health foundation. This should be the contribution of the present generation. It is not only a human tragedy but an economic loss to the city to spend money year after year to educate a boy or girl only to have them cut down by preventable disease. The tragedy is being enacted repeatedly.

"The watchword of all intelligent physicians is prevention. Wonderful progress has been made in conquering disease. Medical men today are getting away from the treatment of symptoms and going back to find and eliminate the causes of disease. They realize that mouth conditions have something to do with health.

"Preventive dentistry was started in Flint in 1918. Of the 15,000 children of grade schools, including the parochial schools, who were examined, 85 per cent were defective dentally. Of these, 25 per cent had pus from putrescent teeth running down their throats 24 hours a day. One-half of the kindergarten children,



Suppose—

*this sort of “salesman”
were to enter your office
—he does!*

YOU can always recognize him (regardless of his “make-up”) by the fact that he *never* offers standard, staple dental equipment or supplies, but always tries to unload goods made down to a “cheap” price rather than up to an ideal of service.

The "stock in trade" of this chap usually includes "imitations" (?) of the *better articles* sold by reputable dental dealers; articles which have cost dental manufacturers thousands of dollars to develop and bring to their present excellence. *You'll never find Trubyte teeth in his "bag of tricks."*

Trubyte

—the teeth gentlemen are proud to sell

Dealers who sell Trubyte teeth are mighty good men to know. They know Quality, and Service is their hand-maiden.

They carry stocks of reliable dental supplies that are complete—they stand guard many times between you and expensive "experiments."

Every dentist is a "buyer" for his concern—he must "buy right" or his concern (his practice) will suffer, and there is probably no activity in business or the professions that will suffer more surely from "cheapness" or sub-standard materials than will a dental practice.

There is a mental, moral and financial uplift that comes with the use of Trubyte teeth, and other goods of quality, that is totally lacking when you deal in substitutes.

Something priceless within us is killed when we accept "good enough" as our motto.

There is something more than just good business when we *buy and use the best.*

RESTORATIONS  THAT RESTORE

Your Dealer or Direct

The DENTISTS' SUPPLY COMPANY

220 West 42nd Street

New York City

babies 4 and 5 years old, had running pus. The pediatrics say that infections affect the health of children more than adults; that children need all their avenues of nutrition and powers of resistance more than adults. In one child examined all of the baby teeth but one were decayed.

"Fathers and mothers of these children would have been mightily interested if they had been obliged to use bandages on a child's body to soak up the oozing from infections, but they were unconcerned as long as it was taken care of by the mouth and was pouring into the child's body, into the blood stream and into the delicate glands of the neck and head, affecting the nutrition more than it could have anywhere else. It does not take a scientific man to realize that those conditions are not good for the child. Through the practice of preventive dentistry for three years that 85 per cent has been changed to 45 per cent."

Dr. Davis then cited individual cases of remarkable improvement resulting from this work. In one room in which every child was taken care of from the point of extractions and fillings, the school physician tried to obtain a 100 per cent in tonsilectomies. In seven cases permission to perform tonsilectomies was refused. The next year in five of these seven there was no evidence of needing tonsilectomy—which does not mean that removal of tonsils is not necessary in some cases, but a large source of tonsil infection is from putrescent teeth, and their removal does have an influence on the general health.

"There was not a single case of sickness in that 100 per cent room that year and the whole room jumped one-half grade in academic work. The retardation of the whole school was cut fully one-half, and the attendance has been increased most markedly. A child with bad mouth conditions is handicapped in physical health and mental capacity.

"In reference to the cost of this clinical work with school children; we have five full time dentists and we have completed work for 5,000 children. The cost amounts to less than 5 cents per \$1,000 of assessed valuation, or about 15 cents for the average taxpayer.

"In reference to our private dentists, we have their co-operation and backing in the work. The school clinic has not hurt dentistry, but has benefited it. Of the 15,000 children examined, less than 1,500 had ever been to a dentist for work of any kind. The clinic cared for 5,000 children and private dentists took care of the same number during the same time. Private practice increased from two to five times in children's work.

"Some people say that the whole thing is a matter of education, but you can educate and educate, but you won't touch the mass. There is a vast number of people who are not able to have dentistry. The income of the average laboring man with several children to provide with food, clothing and shelter is inadequate

to cover cost of dentistry. The majority of people will not go to a dentist until they have a toothache. Then the tooth is past the stage where the dentist can do what ought to be done.

"The only way to take care of the situation is to get the children started in school, so that they will see the advantage of preventive dentistry and keep it up. By examining the children in school and sending home dental recommendations more children each year are having attention. If we can keep up the work for three or four years we will clean up the schools of Flint.

"Many adults would give thousands of dollars if they could have had preventive dentistry in their school days. Semi-invalid conditions and defects which shorten life 10 or 20 years come through infected teeth neglected in childhood. In prevention, diet is a bigger element than the tooth brush.

"The thing which we want to do is to co-ordinate all the effort being put forth and not see only our own little avenue. Dentition in the mass, like orthopedics, cannot be taken care of in a city without clinics. The orthopedic clinic saves the city thousands in the future in making useful citizens of those who would otherwise be hopeless cripples. Clinics are the only solution. They are not a cost but a saving from both the standpoint of benefit to the child and in saving to the taxpayer. In Flint it costs \$70 per child for education. With dental cost on the basis of a dollar per child, if it is wise to spend \$70 per child for education, isn't it wise to spend \$1 for good health? I consider it good economy."

A lively discussion of Dr. Davis' talk followed. Dr. Hildreth made a splendid plea for prevention on the basis that a clean tooth never decays, and said that prevention is the big thing in business and industry, in dentistry and medicine, and that we must all get back of it. Other interesting facts brought out were: That there are approximately 45,000 dentists in the United States and 2,200 in Michigan; that less than 20 per cent of the people are being reached by the dental profession. Dr. Hildreth strongly recommended the school dental clinic as the only solution of dental hygiene for the masses.

Dr. Henry McMillan, of the Grand Rapids dental clinic, spoke of the fine work of the Holmes Club in starting the clinic. He said:

"We began with one half-time dentist. Now we have two men on full time and I can see how we could keep three or four busy with 40 public grade schools, 16 parochial grade schools and five public and parochial high schools."

Dr. McMillan stated the need of a suitable and more secluded place in which to work, saying:

"Every school in the city is crowded to the roof for room. We are working in the basement, where the light might be better. Super-

intendent Greeson is planning the right kind of a place for the clinic in the new North High." He then spoke of the splendid co-operation of Mr. Greeson in the work of the clinic and cited the great need of dental nurses in the schools and more liberty for the nurses in making examinations, saying that they were allowed only a tongue blade and a tooth pick for dental inspection. He also said that very few kindergarten children were received in the clinic.

Dr. Masselink gave a spirited talk urging provision for clinics and said that Grand Rapids parallels Flint in having 85 per cent of its children defective dentally. He said that petitions requesting dental nurses or some care of children's teeth, signed by one-half the parents in seven school districts, were ready now to be presented to the board of health and the board of education.

DEATHS

At Brockwayville, Pa., February 14, Dr. Robert O. Moorehead, retired, 75.

At Tuckertown, Ark., February 14, Dr. Joe Slayden, 40.

At Corning, N. Y., February 16, Dr. Roswell E. Sunderlin, 59.

At Hanover, Pa., February 16, Dr. J. Henry Ruth, 42.

At Winthrop, Me., February 16, Dr. George W. Bates, 63.

At Philadelphia, Pa., February 16, Dr. James W. McPhillips, 47.

At Dayton, Ohio, February 16, Dr. Henry Cowie, retired, 80.

At Portland, Oregon, February 16, Dr. Harry J. Kelly, 42.

At Kalamazoo, Mich., February 16, Dr. W. M. Moffett, 73.

At Pendleton, Ind., February 20, Dr. O. H. Thomas, 72.

At Bridgeport, Conn., February 24, Dr. W. J. Baulieu, 74.

At Fairburn, Ga., February 25, Dr. William Howard Elder, 49.

At Terre Haute, Ind., February 27, Dr. Charles Squa, 41.

At St. Paul, Minn., February 27, Dr. E. B. Weeks, 65.

At Los Angeles, Cal., March 3, Dr. William D. Flory, 43.

At Far Rockaway, N. Y., March 4, Dr. Christian William Wicht, 59.

At Cambridge, Mass., March 4, Dr. Charles P. Kelley, 37.

At Columbus, Ind., March 4, Dr. J. Frank Shaddock, 38.

At Wilmington, Del., March 9, Dr. David T. Smithers, 84.

Kill the candy habit, and the sugar habit, and the breakfast-slop habit, and the white-bread habit, and the meat-habit, and a dozen other equally injurious habits, and you will be doing the human family an inestimable service.

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Detroit dentists have organized The Professional Man's Credit Association, patterned after the Indianapolis plan, the purpose of which is to keep track of dead-beat patients for two years, and supply members with these records. Detroit dentists are tired working every fifth day for nothing, donating their services to a class of people not worthy or needing charity. I certainly hope the movement will spread. There is nobody quite so contemptible as the man or woman who will beat the dentist or physician, after he has given his service for the preservation of health and comfort.

The Wabash, Ind., Dental Society has set aside a half-day each month for the free treatment of boys and girls of indigent parents. The county is to be divided into two districts, northern and southern, and treatment will be given at North Manchester and Wabash, respectively, on Thursdays. This is fine business. Glad some of my friends in Wabash county were the first in the United States to conceive this idea and work it out. Many individual dentists have been doing this for years; but the beauty of this plan is the spirit of cooperation shown. Great good will be done, and those who sow shall reap.

The Pennsylvania State Society meets in Pittsburgh, April 11-13.

Attendance at the Minnesota state convention, February 22, is estimated at 1,000. Drs. F. H. Orton, E. T. Tinker, M. H. Mortonson, Carl D. Lucas and K. W. Knapp were the principal speakers.

Dr. Harold E. Ray, New York, missing since March 17, 1921, and supposed to have been drowned in Hudson river when his canoe was found floating bottom-up, has turned up at Los Angeles, Cal., after a year's wanderings in various parts of the country while under an attack of amnesia, the result of an accident which he does not remember.

The West Virginia State convention will be held at Fairmount on April 10-12.

If anybody wants to know what rational diet and exercise will do for a dentist, he is invited to write to Dr. F. I. Thomas, Logansport, Ind. He has just challenged the world to a foot-race, acceptor to choose distance and all other conditions. He is a runner, a boxer, and of his diet he says: "We don't have meat more than once a month except when we have company. The children hardly know the taste of candy. They get all the fruit they can eat, but no candy. Our diet is largely vegetarian, but we use plenty of milk and are not cranks."

Malformations of teeth and jaws is sometimes the cause of deafness. Correcting the trouble often removes the difficulty hearing.

Pennsylvania—Central

Altoona, Pa., March 1—The twentieth annual convention of the Central Pennsylvania Dental Association concluded its session here today by selecting Johnstown as the place for the annual gathering next year. The following officers were elected for the ensuing year: Roy Black, Huntingdon, president; W. V. Ankeny, Johnstown, vice-president; H. L. Wagner, Altoona, reporting secretary; K. G. Shaffer, Altoona, financial secretary, and James W. Lynan, Johnstown, treasurer. Censors-elect, G. B. Whilden, Johnstown; W. E. Black, Lewis-ton; C. L. Baldwin, Patton.

Minnesota—State

Minneapolis, Minn., Feb. 26—Newly elected officers of the Minnesota State Dental Association assumed their duties yesterday. They were elected Friday. Dr. H. B. Washburn, of St. Paul, was chosen president, succeeding Dr. Max Ernst, of St. Paul. The new vice-president is Dr. Edward A. Shumpik, 2228 Emerson avenue N. Dr. C. H. Turnquist, of Minneapolis, secretary, was re-elected, as was Dr. T. D. Abernathy, of Rochester, Minn., state treasurer.

As the result of a general survey of the examination of the teeth of school children in the first five grades, the astounding fact seems to be that only two children in every hundred have perfect sets of teeth. Certainly time to get busy.

Classified Advertisements under this heading, \$2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more special rate on application.

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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XLII

MAY, 1922

No. 5

ROOT CANAL PROBLEMS*

BY EDOUARD M. HALL, D.D.S., KANSAS CITY, MO.

DIAGNOSIS

DR. HOWARD RAPER HAS SAID, "Nothing is more worthless than an incorrect diagnosis, and no matter how well the wrong treatment is applied, it remains the wrong treatment. First of all, then, make a correct diagnosis."

Much has been written and much needs yet to be written upon the making of a correct oral diagnosis. We shall limit our consideration of the subject to the fundamentals of diagnosis as it pertains to root canal work.

This means that we should discover all teeth with non-vital pulps and determine as nearly as possible the condition of the teeth themselves and the health or disease of supporting tissues. In addition to a study of local conditions the age and general health of the patient, with important matters of family history, must be made the subject of thorough investigation and carefully recorded. The value or necessity of each tooth in its relation to the plan of restoration should be soberly considered, and last, but by no means unimportant, the value of a tooth from a purely aesthetic point of view should be duly recognized and given proportionate consideration.

First, then, we must make a very careful and thorough mouth survey. This means an examination and recording of the exact condition of each and every tooth in the patient's mouth, making note of all missing teeth. If clinical examination gives evidence of some teeth being pulpless, these should be radiographed along with all areas where teeth are missing.

A good radiographic survey of the entire mouth is indeed very valuable and often discloses unexpected conditions, but patients are not always willing to have this done, especially if they have only one or two known pulpless teeth. So, then, unless conditions justify *demanding* a full mouth X-ray, the dentist can insist upon only those that give evidence of being pulpless, along with areas where teeth have been extracted or are missing; this to determine if root fragments or unerupted teeth are present.

The necessity for and value of the X-ray in oral diagnosis can hardly

*The second of a series of articles on Root Canal Problems being written exclusively for THE DENTAL SUMMARY.

be overstated, and we are very certain in our belief that no root canal work should ever be attempted without the aid of the X-Ray. Yet we feel that too many men are putting too much dependence in what they think the X-ray reveals. The X-ray is indeed very valuable, we would say indispensable in oral examination, but it *is not* infallible. It is often necessary and wise to take several pictures, at different angles, of a doubtful tooth or area, and even then many teeth having non-vital pulps cannot be detected.

So, then, the X-ray alone does not reveal many conditions as to health or disease of tooth structures and we believe that every practicing dentist should own and train himself in the use of an electric pulp tester, for without it he absolutely cannot make a complete diagnosis that is worthy of the high attainments of modern dentistry. The electric pulp test, like the X-ray, is not infallible, but properly used in conjunction with the X-ray and transfused light (which will be discussed later), one is able to make valuable deductions and very often the electric test will be found to be the deciding factor.

The Kerr Electric Pulp Tester has been found by the writer to be very satisfactory as an aid in routine mouth examination and diagnosis. This tester can be used either with low voltage current from a dental switch-board, where the rheostat is finely graduated, or can be used with common six volt dry cells.

Be careful never to shock patient by starting with too much current. With rheostat set at six volts or with connections made with dry cells, the *hand electrode* and *dental electrode cords* should be first connected up with *primary coil poles* and tests made as hereinafter explained, and if not sufficient response on *normal healthy teeth*, then connect electrode cords with *secondary coil poles*.

If care is taken to see that *induction coil core* is pulled out only a little way at a time the electrode cords can usually be connected to secondary poles without excess shock to most patients.

Before making any tests all exposed surfaces of the teeth must be thoroughly dried and kept so by using cotton rolls inside and outside the lower teeth and outside the upper teeth. Wipe teeth dry with absorbent paper pellets and blow approximal spaces dry with air blast.

First determine the *normal point of irritation* or *degree of electric tolerance* for each individual patient (this varies with different persons) by selecting apparently normal, healthy teeth, preferably anterior, and make contact upon eroded incisal surfaces, if possible. Begin testing with the electrodes hooked up on primary poles, with the core of induction coil drawn out only a short distance. Remember you are using low voltage and care must be taken to perfectly control and interpret responses.

The hand of patient holding the hand electrode should be free from metallic rings and the like and should be well moistened so as to secure good conduction. Now you have dried the tooth surfaces so that the conduction will be poor unless you dip the metal tip of *dental electrode* in water and

carry a *very small* globule of water to the tooth contact. Or if the operator prefers he can do as Dr. Raper suggests, wrap a small wisp of cotton around point of dental electrode and wet this. Be careful not to have sufficient water to run down over tooth to soft tissues and thus make conduction to living tissue and get shock even though the tooth be pulpless.

Never touch metal restoration of any kind if it goes to a contact with soft tissues or is in contact with metal restorations in adjacent tooth or teeth. Be careful to have very little current if you are going to touch a metal filling even though it is a small occlusal cavity, the filling makes contact with sensitive tubuli.

Go carefully back and forth from one to the other of several teeth having about equal exposure of dentin from erosion until you satisfy yourself that you have determined that patient's normal *point of irritation*, then you are ready to go ahead testing the rest of that patient's teeth. Careful consideration must be taken of the relative thickness, density, etc., of the enamel of the various teeth, and allowances given. Enamel is more or less of a non-conductor. In good undecayed posterior teeth the deep occlusal surfaces, or sulci, are generally the best places for testing.

Dr. Howard Raper's new book, "Electro-Radiographic Diagnosis," should be carefully read and studied by every living dentist.

Now in addition to the X-ray and electric pulp test, we personally feel that our equipment would be incomplete without a good mouth lamp which, when properly used—controlling all light in the mouth so none escapes except through tissue being examined and having patient and operator in dark room or under light proof hood—many conditions will be revealed that will substantiate evidence presented in X-ray and electric tests.

After you have carefully tabulated all conditions as revealed by foregoing examination and test and have added to these the old and well known methods of *Temperature* tests with *Percussion* and normal *Sensitive Test*, you should have a very complete mouth survey for that patient.

Then when you have made proper investigation and record, as suggested, of the patient's age, health and family history, you should dismiss the patient and at your leisure sit down and study conditions and the evidence before you and make up a *Mouth Chart* and *Restoration Plan* of the mouth as a whole and not of individual teeth as separate units. After careful study and consideration of each individual mouth and patient you can then make recommendations that should be worth while. And after all is carefully weighed and soberly considered, if you are undecided as to whether to treat and try to save a diseased tooth or to extract same, let the patient have the benefit of the doubt and take the safer course, which is to extract the tooth and particularly is this the case where the patient is below normal and the tooth history is unfavorable.

There are many things to be considered which we cannot give in detail in an article such as this. We are presuming that the reader realizes that he must have a clear knowledge of the histological picture of normal healthy

conditions of the parts under observation, because without this knowledge he can gain no information from deviations from the normal, i. e., pathological conditions.

Due consideration must be given to the relationship or proximity of the maxillary sinuses, the inferior dental canal and such other anatomical parts as are likely to become involved when close to diseased teeth in their regions. The health of a patient is of infinitely greater importance than the value of a few teeth.

712 Shukert Bldg.

A REAL CHALLENGE TO THE DENTAL PROFESSION*

BY OTTO U. KING, D.D.S., CHICAGO, ILL.

A GENERATION AGO a group of statesmen were discussing the merits of their respective states. One spoke of the coal and iron mines in his state; another of the grain and products of the fields of his state; Daniel Webster, in speaking of his home district, said: "In my state the hills are kissed by the blue sky; the little lakes nestle in the valley; in the distance the great, brown, granite rock, with a stone face carved in outline, lends its inspiration. Gentlemen, in my state, we grow men." I should like to be able to say to the public that through the knowledge of preventive dentistry we grow boys and girls, men and women, who are equipped, who are physically prepared to meet life's battles and to meet them well. In fact, solving the mouth hygiene problem will not only eradicate disease and suffering but will save human lives.

I had an opportunity recently to interview an eminent scientific research authority. We were discussing the smallpox epidemic in Chicago and in the course of the conversation he made this significant statement: "If it were not for the use of smallpox vaccines there would be 250,000 deaths in Chicago from this dreaded scourge." I was startled by this statement because it visualized in a practical way what scientific medicine has done for the human race. This is aptly illustrated by the report of the health authorities in Chicago, which lists not a single death as having occurred from smallpox. Even the scourge itself among the thousands who have not been vaccinated is not as virulent in type as it was in days before the discovery of vaccine for smallpox.

One after another the great besoms have been eradicated from the face of the earth by medical science. Therefore, the great mass of people today do not die from one of these plagues; ninety out of every one hundred die probably because of some simple infection, the result of a focal infection, the focus itself probably causing no trouble. Dr. Mayo says that ninety per cent of the lesions of focal infection are above the collar, which includes the tonsils, the antrum, the nasal passages and sinuses.

*Read before the Ohio State Dental Society, December, 1921.

The fundamental question that we are raising in this paper is the same one that was put to Jesus Christ by His disciples when He healed the unfortunate wayfarer: "Who has sinned, this man or his parents, that he should have been born blind?"

SOME STARTLING FACTS

About two and a half million babies are born in the United States each year. Nearly half a million die in their first year, and half of the entire number are dead before they reach their twenty-third year, before they have had a chance to do either much good or evil in the world. Of the one and a quarter million who live, a certain proportion become industrious citizens of average ability, and the smaller proportion are the leaders of men, the doers of deeds, while there is a very definite proportion who, by reason of heredity, become criminals, epileptics, paupers, alcoholics. The more healthy and able people of the United States have to support these incapable ones. There are about half a million insane and epileptic, feeble-minded, blind, and deaf; there are 80,000 prisoners and 100,000 paupers—all of whom cost the United States over a hundred million dollars a year.

In these United States and in this year of peace, 1921, more lives than the whole empire of Great Britain lost during any year of the Great War will be flicked out by two diseases which are curable and preventable. Nor will the year 1921 stand alone. In the four and a half years of intensive warfare between 1914 and 1918, the fifteen civilized nations which fought at Armageddon have given to these twin scourges a heavier toll than they did to bullets, shells, gas, air-bombs, and all the ghastly, wholesale killers of modern battle. Yet these two diseases present no mystery to the modern physician or dentist. They may be cured; and their infection can be checked at its source.

In New York City last year sixty-seven thousand children failed to be promoted to higher grades because of absence, 80 per cent of which can be laid to defective teeth, and it costs New York \$1,037,696 to duplicate a year's schooling to these absentees. These same children in a few years will be employed by our industrial concerns and a large percentage will fail of promotion on account of poor health due to bad mouth conditions.

Each day lives are needlessly destroyed which equal a population of a town of almost 2,500. Every year sacrifices of life through ignorance and neglect equal the population of a city larger than St. Louis. While we are discussing this problem today, over one hundred Americans will die, sacrificed to the god of ignorance.

One woman out of seven and one man out of eleven, after the age of thirty-five years, die of cancer in England. Cancer is sixth in the list of diseases that cause death in the United States; there has been an average of 73,000 deaths from cancer for the last ten years. In New York state, in 1913, 9,528 deaths were caused by cancer. Cancer caused over nine times as many deaths as typhoid fever. In twenty years the death rate has in-

creased 166.66 per cent. If this rate continues for another twenty years, the death rate from cancer will be more than from consumption.

Different estimates indicate that from 9 to 26.3 per cent of all cancers are found on the tongue. Still others announce that one-seventh to two-fifths of all cancers are on exposed surfaces where they should be discovered early, operated upon, and cured. Equally significant is the estimate that one-third to one-half of all cancers are found in the stomach and duodenum.

Dr. F. S. J. Steadman, of England, reports after an examination of 112,801 cases, that it is his belief that cancer rarely occurs in any part of the body without a more or less long-standing chronic inflammation preceding it, and that a *chronic septic condition of the mouth is by far the commonest predisposing cause of cancer.*

Dr. Sampson Handley says: "The importance of chronic irritation, and especially of bacterial irritation, as a cause of cancer, emerges ever more and more. It is probable, in my opinion, that oral sepsis comes only second to syphilis as a cause of mouth cancer. In cases of cancer of the tongue, carious teeth and pyorrhea are prominent features, and, as causing gastric ulcer, *oral sepsis is a remote cause of gastric carcinoma.* A national campaign against oral sepsis probably would lead to an appreciable diminution in the mortality of cancer."

Dr. Daniel says: "If the antecedent to cancer formation is irritation of the tissues, then it follows that bacterial infection is the commonest known cause of cancer. The widest spread form of bacterial infection known to me is oral sepsis, and I believe, therefore, it is the most prevalent antecedent cause of cancer, both direct and, by its remote action, indirect."

Returning to Dr. Steadman's investigations, we find, as the result of an examination as to the mouth conditions of 204 patients suffering from cancer in the alimentary canal, that 165 were suffering from advanced cases of chronic suppurative periodontitis; 30 from moderate cases of the disease; 8 from slight pyorrhetic conditions, and in one case the mouth was free from any trace of pyorrhea alveolaris. He thus found that 99.5 per cent of these patients were suffering from periodontal disease. After his long series of investigations, Dr. Steadman is convinced that pyorrhea alveolaris is by far the commonest predisposing cause of cancer of the alimentary tract. And it also seems probable that pyorrhea alveolaris predisposes to cancer in other parts of the body, by starting and maintaining a chronic inflammation upon which malignant change eventually supervenes.

\$100,000 FOR MAN WHO WILL DISCOVER CAUSE OF CANCER

Dr. Bloodgood, of Baltimore, Md., says: "I am confident that cancer of the skin and mucous membrane of the oral cavity will practically disappear if the public is given this information in such a way that it will be understood and acted upon."

The chronic irritation of an abscessed tooth, the irritation of decayed

roots, impacted teeth, and unerupted teeth lower the resistance of the surrounding tissue and invite the development of cancer. Diseased and uncleaned teeth and gums are sufficiently irritating to produce inflammation and ulceration of any part of the mouth. It is not unreasonable to believe that conditions such as these produce cancer of the mouth. Mayo and other surgeons and stomach specialists estimate that from 45 to 90 per cent, perhaps, of all cases of cancer of the stomach originate at the site of an ulcer of the stomach or duodenum.

Among the most frequent causes of ulcer of the stomach are unmasticated food, too much food, and the constant swallowing of the contents of a diseased and unclean mouth. Food is bolted or not chewed either from habit or haste, or because decayed, deformed, or deficient teeth make proper chewing difficult, if not impossible.

Rosenow has experimentally proved that one particular micro-organism found in unhealthy mouths is capable, when carried by the blood, or when lodged in the wall of the stomach, of producing gastric ulcer.

A great amount of evidence shows that one of the most certain measures to prevent cancer, either in the mouth or stomach, is sound, clean teeth.

At Trenton, N. J., there is a state hospital for the insane. The superintendent, Dr. Henry A. Cotton, claims to be discharging 75 per cent of those admitted to his institution by means of cleaning up mouth sepsis and its sequelae, the infected tonsil and the gastrointestinal ulcer. Dr. Cotton has been doing this work for a period of ten years. The bacteria found in the mouth, or their products, selecting the brain as their field of activity, become the direct cause of abnormal mentality.

A definition of insanity which meets all tests is "the inability of an individual to accommodate himself to his circumstances." If the bacteria of the mouth, or their toxins, will cause an adult so to conduct himself as to be legally adjudged insane and committed to an institution for these unfortunates, is it surprising that these same organisms in a child, whose susceptibility is much greater, should cause him so to conduct himself that he fails to harmonize with his teacher and the general plan of school work?

It is not claimed for a moment that all the bacteria found in the mouth are brain selective as far as their toxic effects are concerned, but it is true of some at times. Again they may form the bacterial overload which results in mental unbalance in borderline cases.

A few months ago, I was an honored guest at a banquet in one of our Pacific coast cities. The toastmaster of the evening was late in arriving and, in offering his apologies, he startled me by saying that he had just left the bedside of his wife, who was critically ill in the hospital. A few moments of silence followed, and then he said: "Dr. King, I have never seen a perfectly healthy woman. What is wrong with scientific medicine and dentistry that we cannot raise the standard of health of our citizenship?"

The American Public Health Association states that, of the 110,000,000 citizens of this country, 45,000,000 are physically imperfect; 1,500,000 die every year; 3,000,000 never leave their beds; 1,000,000 have tuberculosis, and from 2,000,000 to 3,000,000 have hookworm and malaria. Only 37,500,000 are fairly healthy and 19,500,000 in full vigor.

Ernest E. Irons, M. D., says: "The intimate relation, sometimes causal and sometimes resultant, between diseases of the mouth and general disease needs no emphasis. The recurrent glossitis and other oral inflammation of pernicious anemia, the hemorrhages of the gums and mucous membranes in leukemia and scurvy, and the herpes associated with gastric disturbances, exemplify the close interrelations of the tissues of the mouth with the rest of the body. The degenerative diseases, including arteriosclerosis and chronic nephritis, appear to depend for their cause in part on chronic infections derived from the mouth."

The heart disease of the nation is largely traceable to mouth infection. Figures from the Bureau of Vital Statistics show the relative importance of heart disease as compared to tuberculosis. The decrease in death from tuberculosis was 30 per cent between 1907 and 1916. The increase from death in heart disease was 159.4 per 100,000, in 1916, as compared to 123.1 per 100,000 in 1900. Therefore, heart disease is a greater menace than tuberculosis, and it is equally true that heart disease to a very large extent is preventable by proper mouth sanitation.

A CASE OF NECROSIS

A few years ago in a clinic I saw a case of necrosis in a six-year-old boy. This boy had lost almost the entire mandible, including the condyle of the left side and its partially formed teeth, with the exception of the lower right first permanent molar and incisors. All the pain and misery and disfigurement were due to an acute alveolar abscess in a lower left, first, temporary, molar. The clinician had on exhibition both the boy and the entire bone as removed. As I looked at the bone and then at the boy, after learning from his own lips his clinical history, I was forcibly impressed with the great anxiety and suffering that the sin of ignorance demands, and then these lines of Longfellow's came to me:

"There is a Reaper, whose name is Death
And with his sickle keen,
He reaps the bearded grain at a breath,
And the flowers that grow between.
'Shall I have naught that is fair?' saith he
'Have naught but bearded grain?'"

I say no! A thousand times no! The flowers are not for the harvest but for health, and I like to think that I am in a profession, that I am a citizen of a great country that assumes the responsibility of helping to dispel this sin of ignorance against the child.

STARVATION AMONG SCHOOL CHILDREN IN CITY IS INCREASING

The number of cases of starvation among the school children of New York has been more than trebled in the last decade, according to figures recently published by their health department.

While disease has declined, with the exception of defective teeth, the alarming increase in cases of malnutrition has been revealed, much to the concern and consternation of those interested in child welfare. Malnutrition is a scientific term. It means, however, that the bodies of the little children are below a state of normal growth and health. Considering the fact that the state of a child's organism forms the basis of his physical condition when he grows up, the situation becomes alarming. It is seldom and only with very special and intensive care that one can outgrow the effects of childhood. The condition appears still more serious when we consider that the number of starvation cases occurred in a year of "great prosperity"—1919.

IS A CHILD'S LIFE WORTH SIX DOLLARS?

How much does it cost to prevent deaths from diphtheria? The *Ohio Public Health Journal* gives the experience of the city of Salem, Ohio, for twenty years. During the ten years from 1890 to 1899 this town of about 10,000 inhabitants had 162 cases of diphtheria with 48 deaths, or 30 per cent. In 1900 the city health authorities began furnishing free antitoxin for all cases of diphtheria. In ten years, from 1900 to 1909, there were 126 cases, with only one death, a case in which antitoxin was not administered until the third day. Had the percentage of fatalities been as high during the second decade as during the first, Salem would have had 37 deaths from diphtheria in that time. The free antitoxin furnished for the ten years cost the city approximately \$220.00 or an average of \$6.00 per life. Any community desiring to know how much it would cost to save a child's life from diphtheria can ascertain this by multiplying the annual number of diphtheria cases by the cost of 5,000 units of antitoxin and dividing the results by the number of deaths from diphtheria each year.

GREAT LOSS TO INDUSTRY THROUGH ILL HEALTH

Eight hundred million working days each year are lost to industry through ill health. This represents a money loss of three billion dollars, the equal of one Liberty Loan. It is estimated that by the establishment of efficient public health nursing two-thirds of this amount can be saved.

Industry in the past fifty years, in its effort to increase production, has spent its greatest efforts in perfecting machinery and mechanical appliances, and now its efforts must be extended to perfecting the human machine. The industrial dental dispensary during the last few years has been a contributing factor in increased production.

The medical profession has demonstrated that malnutrition is one of the greatest factors in all diseases and upon this basis I have no hesitancy in saying that in my opinion the earning capacity of a man is in relation to the condition of his mouth.

The sad thing about this subject is that the great dental and medical professions, the social workers, the politicians and legislators, as individuals, have not received a vision of the tremendous responsibility that they owe to humanity. Thus the spirit of indifference and "don't care" has char-

acterized all of our work for the betterment of mouth hygienic conditions simply because we do not know the price that humanity and the state and nation have had to pay, owing to our ignorance on this subject.

The politician's attitude toward this problem is aptly illustrated by the action taken by the Mayor of New York City. On March 1 came the announcement that the Mayor had deemed the expenditure for the establishment of dental clinics in public schools to be unwise in the face of other pressing financial needs of the city.

"For three years now," said Alderman Vladeck, "we have tried to get this comparatively small appropriation for this very important purpose. If we do not establish these clinics now it will cost us a whole lot more later on in the hospitals. We owe it to the children of the workers of the city to do this for them.

"You aldermen," he continued, "are unrestrained in your munificence toward the fire chief, who wants the most expensive cars (\$8,800.00), yet you hesitate when we appeal for the children. I would tell the Mayor: Don't economize on the dental clinics. It is shameful, to say the least, that he should wish to do so."

Thus the public school children of New York City will be denied proper dental attention during the year 1922, thanks to the Tammany Hall administration.

This false economy now being practiced in New York is all too common in this generation.

WHAT DO YOU CARE?

Out to the mines in the chill of the morn,
Stunted, ill-nourished, comes the forlorn
Stream of humanity—undersized men,
Slaving and toiling for life-blood; but then
Dressed warm and cozy, with slate, book and rule,
George and your Nellie have started to school;
They are your children, their cheeks warm and fair
While Tony's a hunky, so—what do you care?

Over the bridges, the hills and the fen
Streams the procession of undersized men,
Climbing the stairs to the waiting machines;
Lowered in cages to death-marked ravines;
Look at their faces—sad, pinched and worn!
Look at their garments—threadbare and torn!
Look at their swagger, their precocious air.
Some mother's babies, but what do you care?

RECORDS OF METROPOLITAN LIFE INSURANCE COMPANY'S INVESTIGATIONS

That bad teeth are a contributory cause of bad health is a fact that has long since been established by medical research, and to prove the theory one need but refer to the statistical records of any of the large life insurance companies. The Metropolitan Life Insurance Company, for instance, in the year 1917, paid the principal to the beneficiaries of 52 industrial policyholders whose deaths were directly traceable to unhealthy and infected conditions of the teeth and gums.

ELIMINATING CRIME BY THE ESTABLISHMENT OF DENTAL CLINICS

In an address before the Medical Association of Greater New York, Dr. E. W. Lee said: "Crime is a mental disease due to some physical

defect." He reported a case of a mother who, driven to despair over the radical change in the character of her son, appealed to a physician to examine the young man, who was then nearing the end of a second term in prison. The physician did so and found his teeth in a wretched condition. They were not only badly decayed but the X-ray showed chronic abscesses at the roots of many of them. The young criminal, who was supposed to be morally depraved, also suffered greatly from adenoids and defective sight. After his physical ills had been remedied, so far as possible, his disposition changed completely and he is now a normal and industrious young man of good character.

We are beginning to realize that decayed teeth, adenoids or foreign growths of any kind, thickening of the skull, or anything that causes abnormal pressure on any part of the brain, may make a fiend out of a saint. We often see naturally kind, amiable boys and girls suddenly change and become brutal, coarse and even criminal in their acts and tendencies. But instead of seeking the cause of the unnatural change in their disposition, we abuse or punish them for what it is not in their power to control.

I heard Dr. Luther H. Gulick, for many years director of the New York public schools, say "that a great number of boys and girls drop out of school every year because of failure to pass their examinations, and that their failure in many instances is due to bad teeth, impaired eyesight, defective hearing, adenoids, lack of proper nourishment, and other preventable causes. The children do not appreciate these things, and often do not know why they are so dull and inefficient. Humiliated by their failure, they leave school discouraged and disheartened, and are likely to become moral and mental delinquents."

Who can estimate how many thousands are driven to crime because of their failure in school! Who can tell how many life tragedies begin with disappointment in school over failure to pass examinations, failure often due to some physical defect.

PERSONAL INTERVIEW WITH DR. MACMILLAN, DIRECTOR OF THE BUREAU
OF CHILD STUDY IN CHICAGO

In securing facts for this paper, I had an interview with Dr. D. P. MacMillan, Director of the Bureau of Child Study of Chicago. Dr. MacMillan has been in this work for twenty-one years and he has the care of approximately 9,000 children each year in his department. He said:

"The kinds of cases that come to me are classified into three divisions: physical defects, mental defects, and minor misconduct. The last count on the sum total of physical defects distributed as to crimes shows that among backward children about 60 per cent of the trouble is due to poor teeth. I believe that defective teeth is one of the most potent factors in malnutrition, and malnutrition, in turn, is almost one of the invariable accompaniments of misconduct.

"Suppose I take such a simple thing as truancy and incorrigibility."

Dr. MacMillan selected the following case at random from a large number of reports that had just been placed on his desk:

"Here is a child, aged eight years and six months, who has been in school for a year and a half. His mother reports him as stubborn, in-subordinate, not trustworthy on errands. Tonsils and adenoids were thought to be contributing factors. These were removed at the hospital. He still remains a problem case. Seven decayed teeth were reported, with no chewing surface, but nothing has been done. He is poor in nutrition, restless, heedless, irritable, pugnacious, rather dull mentally and, of course, backward in school. It will cost seven times as much per year for the city to educate this boy now by sending him to a special division. The cost of education in the public schools of Chicago is about \$35.00 per pupil per year. For a special student it is just seven times as much, not taking into account all the labor of the people who must take care of him physically and morally."

Dr. MacMillan further stated that it is a self-evident fact that it would have been more economical for the city of Chicago to have cared for this boy's teeth from the time of his entrance into the school.

Dr. MacMillan then cited the following case:

"A boy aged eight years and nine months was reported by his school teacher and principal as being unable to carry on the work of his group or class. The child was examined by this bureau and an outline was made of his physical requirements and his special educational needs. He was seen, subsequently, every year until the age of thirteen years and nine months, when the problem became aggravated in the school, that is, it was difficult to know what to do with him because he became too large for association with smaller boys and girls. He was a little too bright to be sent to a division for subnormals but above all he had pronounced physical defects that were not cared for year by year. He had one discharging ear, a slight defect of vision, nine diseased teeth, many bad physical habits, and he became incorrigible in the home, though quite submissive and tractable in school. At the age of fifteen years he left school to go to work. Two and one-half years later the boy was charged and convicted of murder.

"The boy ought to have been given adequate physical care and adequate social care as well as adaptable educational care from the moment it became apparent that it was impossible to keep him in a group of pupils of his own age. After argument and persuasion the mother was induced to take her son to an oculist and \$3.50 was spent for glasses. He was asked to go to a dentist and have his teeth properly cared for, but the mother strenuously objected on the ground that it would cast \$17.00 to have the teeth filled. She could not afford it. Her attention was called to this year after year, and the case still neglected. When the boy was examined at court at the time of his conviction, it was found that the defects still persisted, most prominent among them being the uncared-for teeth. In actual

dollars and cents it cost the state for the prosecution of this child along a sum estimated at \$26,000. And the question naturally arises, Would it not have been very much more advantageous for the state or some agency to have spent one-thousandth part of this sum in the early life of this boy and thus feel assured that the crime of which he afterward was convicted could not have been laid at the door of neglect?

"As a matter of plain fact, day by day we find that bad teeth, poor nutrition, irritability of behavior when coupled with poor home conditions, almost invariably make a problem for society."

Dr. MacMillan, after twenty-one years' experience, has come to the definite conclusion that this problem can only be solved by extending state education down to the early years of child and home life.

I was seriously impressed with the cases referred to by Dr. MacMillan, particularly the sad one of the boy who had committed murder, and I am wondering who is responsible for this unnatural twist in the boy's nature. Who closed the door to the boy's future, to great achievement, to a grand career, a glorious life, by giving him a tendency toward crime at the outset? Who stifled the boy's ambition, putting him at a tremendous disadvantage in the world by making the unthinking look at him askance? Who is responsible for the finger of scorn pointed at this unfortunate boy, the taunts that made him still more bitter? Who had sinned? Who had planted the fatal seed which brought the harvest of despair and disgrace to a young life? Who bent the young twig, dwarfed the possible oak into the miserable scrub-oak? Who is responsible for the blindness of ignorance that caused this soul to fall by the wayside? Is this boy, his father, the school authorities, society, or the medical man responsible?

Every child has a right to demand of us a fair chance in life; start him without preventable handicaps and the best opportunities.

Dr. Hyatt says: "There is an average of five cavities in every mouth. This will give us, roughly speaking, over five hundred million cavities in the teeth of all the people in the United States. Allowing one-half hour as being necessary to prepare and fill one cavity, this would mean that it would take two hundred and fifty million hours to do this work. Taking out holidays and Sundays and allowing thirty days for illness and vacation, and working eight hours a day, it would take one hundred and twenty-five thousand dentists in the United States to do the job in one year. If one per cent of this work needed to be done over again from any cause whatsoever, we would have five hundred thousand cavities to take care of. If any of these teeth were in such condition as to need the pulp removed and the roots filled, the allotment of one-half hour for each cavity would be far too small. If we add to this the time necessary for crowns, bridges, plates, extractions, etc., we will then gain some idea of the amount of time necessary to put the mouths of the people in good condition. But even when all this tremendous amount of work is done we still find that the cause that brought about this condition has not been removed."

Dr. Vaughn says: "We must reach the children—not depend on popular lectures only. We must go direct to the people with the educational propaganda. To have a great nation, we must have health. Turks and mosquitoes destroyed Greece. Ill health means poverty. One-third failed to pass the medical examination in the great draft. *Ignorance and neglect are the causes of our trouble.* I would suggest the examination of every student in all kinds of schools. Teach more health to children and less about disease."

The true aim of dentistry is to ultimately eliminate itself. The true physician and dentist are not engaged in "doctoring." Their business is to get to the fundamental causes of diseases and then educate the public to adopt preventive measures. "When the program of reparative measures is converted into a program of prevention, the ax will be laid at the root of the tree."

"Pending the day of that notable discovery, the logical point of attack is the early filling of cavities. Since intrinsic tooth infection causes the loss of a greater number of teeth than extrinsic infection, and is largely preventable by cavity treatment, the total of dentistry may be reduced more than half, and the harm from infection even more materially reduced by a relatively simple technical therapy—the filling of tooth cavities." Dentistry must solve the fundamental problem of cavity prevention.

Dr. Gilmer says: "Children rarely have dental decay until they are approaching their second birthday. This seems to indicate that the change from infant diet to a mixed diet is a factor in the production of decay in children's teeth. The studies of Drs. D. J. Davis, Jackson, Moore, and others have definitely proved that improper diet has a positive injurious influence on the gums and underlying bony structure. Scurvy, which is supposed to be due to dietetic causes, profoundly affects the same tissues. With these facts in mind, we may suppose that improper feeding changes as well the secretions of the mouth, so that certain constituents which normally inhibit the growth of acid-forming fungi are lacking, or that others are supplied, which in combination with food remaining about the teeth, give the best possible medium for bacterial growth. If this is true, we may believe that since dental decay begins with the change of diet, that error in properly balancing the diet may have much to do with decay of teeth. We do not raise the question as to the probability of improper diet being fundamental as a predisposing cause in other infections about the mouth, such as pyorrhea alveolaris, a disease the etiology of which is obscure.

"Of the child's first teeth, the molars are most subject to decay. If these teeth are neglected and decay, their pulps become exposed and the child suffers pain from mastication, and as a result he bolts his food, thereby throwing an unnecessary amount of work on the stomach. Later the pulps die with alveolar infection as a certain sequence, and as a result a definite channel is opened from the infected roots to the blood stream through which pass bacteria from the mouth. Reports by Dr. Fones, of the Bridge-

port Schools, and Dr. Guthrie, of the New Orleans schools, show definite lessening of contagious diseases among children as a result of perfect oral hygiene."

Dr. Black taught that caries was an infection, like measles, chicken-pox, whooping cough, and the other infectious diseases of childhood, and that the average human being acquires immunity to caries of the teeth as he acquires immunity to measles and whooping cough. Therefore, if the teeth can be saved until he acquires that immunity, he will probably retain his denture throughout life.

Extension for prevention as taught by Dr. Black meant the prevention of the beginnings of caries, what he termed prophylaxis, not polishing the tooth surfaces, not tooth manicuring, but the prevention of the systemic conditions related to diet and health which made the individual susceptible to the infection of caries.

More than ten years ago Dr. Black presented a paper in which he showed that he could produce deposits of calculus upon his own teeth at will and upon the teeth of others; that it was a matter which was related to diet and systemic conditions, and yet the profession has failed to grasp this fundamental truth.

The evil of the American saloon was the cause of the enactment of the Eighteenth Amendment to the Constitution of the United States. The American public finally became conscious of the idea that the temperance problem in America was an economical one and when they became convinced that they were paying a tremendous tax to this monster, year after year, they immediately eradicated it from the body politic. Likewise, when the business man, the taxpayer, the educator, and the citizen of America wake up to the fact that the mouth hygiene problem is an economical one, then and only then will the mouth hygiene problem be solved. Our function at the present time is to educate the profession and the public in preventive dentistry.

EDUCATION THE REAL SOLUTION

The American propaganda in the war and American leaflets and other matter were as bitterly honest as the bayonets. They were victorious over the enemies' underhanded methods because they told the truth in publicity. A typical American plan when in need of German deserters for information was to actually reprint the American mess menu and shoot it across with these words: "These rations are given to prisoners." And they could check results on this publicity because many prisoners when they walked over to surrender actually asked for the food as advertised.

What we want is mass education—one stupendous piece of propaganda to teach a fundamental and therefore non-sectarian principle of living—which, when assimilated, would automatically dispel half of our health problems and make the way easy for the solution of the rest.

"We can change the whole face of existence as Mr. Lloyd George has said, but only if we organize the imagination of the nation and concentrate

public opinion on some principle which touches our emotion, and so gives our work, from statesmanship to street sweeping, a new and collective aim."

THE SCOPE OF PUBLICITY

Edward Morse says in the *American Journal of Public Health*: "Publicity properly applied will save more lives than any other single agency employed by health workers. It should be entered in the Public Health Pharmacopoeia as an accredited remedy for human ills. It is being applied to individuals in capsule doses of public education. It is also being applied to masses of people over whole areas of country as public health agitation for far-reaching reforms and for needed new health laws or regulations and for the enforcement of laws on the books."

Publicity prevents tuberculosis and dental diseases and builds hospitals and infirmaries to cure them. It saves the lives of children and adults and controls epidemics of smallpox. Thousands of babies are today alive in the United States, largely because big doses of publicity were administered to the public by health propaganda, through exhibits, newspaper articles and lectures. One of the most important cities of this state endured an epidemic of smallpox that increased for a year or more. Then the State Department of Health announced that its policy in dealing with epidemics would be state-wide publicity. When the people of that city realized that their low health standards were to be advertised broadcast through the pages of newspapers and would come to the knowledge of the people of the whole state whose lives were being menaced, the city officials soon found merit in the program of the state.

A SUMMARY OF STARTLING FACTS

1. About two and one-half million babies are born each year in the United States. One-half million die each year, and one-half of the remaining number die before they are twenty-three years of age.

2. It costs the healthy citizens of the United States one hundred million dollars each year to support the physical and mental defectives—the criminals, epileptics, paupers, feeble-minded, deaf, and blind.

3. In New York City last year, 67,000 children failed to be promoted to higher grades because of absence, 80 per cent of which can be laid to defective teeth, and it costs New York \$1,037,696 to duplicate a year's schooling to these absentees. Just think of 777 children committing suicide in the United States because of failure to pass examinations, fear of punishment, and unhappy homes!

4. Scientific researchers in the field of cancer report that cancer of the skin and mucous membrane of the oral cavity will practically disappear if the public is given this information in such a way that it will be understood and acted upon.

5. Dr. Henry A. Cotton, superintendent of the state hospital for the insane at Trenton, N. J., is discharging 75 per cent of those admitted to his institution by removing foci of infection.

Crime is a mental disease due to some physical defect. Many crimes

would never have been committed, and a large number of criminals could probably be released today if mouth hygiene could be thoroughly practiced in a practical way.

6. Dr. Ernest E. Irons says: "The intimate relation, sometimes causal and sometimes resultant, between diseases of the mouth and general disease, depends for its cause in part on chronic infections derived from the mouth."

7. The heart disease of the nation is largely traceable to mouth infection. During the past fifteen years the death rate from Bright's disease has increased 15 per cent; that deaths from heart disease have increased 27 per cent. Mouth hygiene can prevent this mortality to a great extent.

8. The number of cases of starvation among the school children of New York has been more than trebled in the last decade. With the exception of defective teeth, disease has declined. There has been a tremendous increase in malnutrition and the basic cause of malnutrition is bad teeth. Malnutrition is one of the greatest factors in all diseases.

9. Eight hundred million working days each year are lost to industry through ill health. This represents a money loss of three billion dollars, the equal of one Liberty Loan. Industry must include in its program the perfecting of the human machine.

10. It would take 125,000 dentists in the United States each year to fill the five hundred million cavities in the teeth of our people. If we could consummate this tremendous amount of work, the real cause that brought about this condition would not be removed.

11. Extension for prevention means the prevention of caries, an infectious disease, immunity from which may be secured by proper diet and mouth hygiene.

12. In conversation with Hon. Richmond Pearson Hobson recently, he informed me that one-half of all the babies in the world die before they reach their fifth birthday. He says that ignorance is the real cause of this enormous wastage of human life.

13. Epilepsy, ear troubles and nervous disorders may be caused by tooth decay.

14. Eradicating ignorance a cure. Education alone is the real solution of this great problem.

THE DENTAL PROFESSION MUST NOT "DIE ON THIRD"

In one of the hottest baseball games of the season, in the last half of the ninth inning, when the score was tied, there was a man on first, one on third, and a fairly good man at bat. The captain of the batting team was coaching at third, and among other things he was heard to call to the runner—"Don't go to sleep."

There was just one more leg of the square for the runner to cover in order to score a winning run. The captain was alive to the need of that runner to keep a safe distance from third and to take advantage of the least possible hitch on the part of the pitcher or catcher of the opposing team.

Too many men in business or a profession make a fairly good start early in life; they get to first, and second, and if they are fortunate they get to third. But a great majority go to sleep and many die there without making the last final pull to get home—real success.

The mouth hygiene problem, the player of the dental profession, has almost gone to sleep on third. Organized dentistry must inject into its very life new plans and enthusiasm, so that this great humanitarian project may score a great victory for the present and future generations. It will not pay for us to go to sleep on third.

A few years ago, typhus raged in one of the Balkan states. Men, women and children were stricken down by the fatal disease. The death roll mounted to thousands and tens of thousands, if not into the hundreds of thousands, and the appalling death rate was due to ignorance. It was due to the fact that the people were too ignorant to use proper precautions in the care of the sick and in the burial of the dead. We in America cannot understand such infatuated ignorance. We in America cannot understand how a people does not take proper precautions to safeguard public health. We are too highly educated, too far advanced in culture and intelligence to permit such crime against the public welfare; and yet, right here in America, 80 per cent of our people, four-fifths of our population, are menacing the health of the other fifth and of themselves because they do not and will not exercise the proper prophylaxis of their mouths and of their teeth.

The average man is too little inclined to realize how much medical science has done for him. We do not remember the great scourges that afflicted the world in past centuries; we have forgotten the Black Death, which more than once decimated the population of whole countries; we have almost forgotten even the smallpox, once considered inevitable as measles, though it claimed its victims by the thousands and disfigured multitudes of those whom it did not slay. Through antisera and surgery, through improved sanitation and increased knowledge of hygiene, the average span of human life has been increased noticeably; and the credit for the advance is due to scientific medical research.

But the movement is by no means completed. If anything, it is only beginning. The progress of the past has been astounding; that of the future may be amazing beyond all calculation. Today, in our laboratories are many valiant and capable battlers with disease germs, the most deadly enemies of mankind. What the warriors of science will accomplish in future, few can predict; but their achievements in the past have been striking, even phenomenal.

"Let there be light" is the commandment that was sounded in the beginning of history and all down through the misty past this has roared in the ears of the conscientious leaders of mankind. Abraham, Moses, Savonarola, Livingston, Florence Nightingale, Lincoln, Jenner and others have caught a vision of the great light that would heal the sins of their age.

Reed, Carroll and Lazar gave their lives to eradicate the scourge of yellow fever and thus made possible one of the greatest engineering feats of history. Many uninhabitable places have become garden spots of the world because of their noble work. Progress seems to follow in the wake of heroic sacrifices. The man who has caught the prophetic vision has seldom, during his lifetime, been popular. The Orthodox, the Reactionary, the Pharisee and the Philistine have ever been on the alert to make the highway of real civilization an uneven, mountainous road to travel.

The basic principle of life is service to others. Today, humanity, with uplifted face, demands light from the dental profession.

This handwriting on the wall is visible to the real leaders in dentistry and must be translated in terms of peace, happiness and long life to the race.

It was my good fortune to hear Private Peat lecture, and in reply to this question: "What was the most tender, gentle thing you ever saw a soldier do?" he replied:

"After the first gas attack at Ypres, in April, 1915, I was knocked out for a while and was in the clearing station at Merville. One day when I was lying there on a stretcher, a poor miserable soldier came in. He was covered with mud and blood. He was minus his overcoat and his tunic was torn by shrapnel. He was soaked to the bone, for it was raining, and he was shivering with cold and pain. The nurse hurried to him and asked him what had become of his overcoat.

"'Oh,' he said, his teeth chattering, 'my pal was killed back there, and he looked so cold, lying there in the rain, I took off my coat and put it over him.'"

If men in the trenches, with their dirt and their filth, their swearing and fighting, can show such tenderness and unselfishness and sacrifice, are we, members of a great profession, who have it within our power to save human life, going to fall below them in nobility of spirit?

"The public has put the dental profession face to face with a tremendous challenge. We cannot throw up our hands or run away from our sacred duty to humanity. We cannot even wait for the ideal method of solving the mouth hygiene problem. We must use every ethical means possible in our program for the elimination of ignorance. I am sure that the historian of the future will chronicle the fact that the dentist of this age, when he visualized the command 'Let there be light,' responded, 'And there was light.'"

The dental profession, in answer to the great educational challenge, will be a lighthouse, sending forth its beacon light so that humanity will not be cast on the rocks of ignorance.

127 No. Dearborn St.

REPORT OF A CASE*

BY L. E. CUSTER, A.M., D.D.S., DAYTON, OHIO.

September 7 last, a Mr. P. came to my office saying that he had cut short his vacation because of pains in his mouth. Being in pain, I gave him an appointment for later in the day.

He had a good set of teeth generally, my only previous services had been the occasional removal of a little salivary calculus from the lower incisors and the upper molars, a variety familiar to you all.

This day, on his return, I questioned him as to his pain and decided there was a dying pulp in some lower anterior tooth, but at that time it had not progressed far enough for a positive diagnosis as to the *particular* tooth. I made the three tests: light, percussion, and thermal changes, in their order, but they showed no difference in any of the teeth.

His teeth again needed a little attention as to the calculus. This was of the salivary variety above referred to, which was easily and quickly removed. After this, we went into the library where the conversation was upon what he should look for in the next few days when the symptoms of the dying pulp became more pronounced. During this conversation, he did not expectorate, showing there had been little blood caused to flow during the removal of the calculus.

I made an appointment for 48 hours later with instructions to return sooner if there were any developments. He did not keep the appointment and I heard nothing from him until about ten days later when I was called to the phone by his wife asking me to see him. I was about to give him an appointment when she interrupted me by saying that he was in bed and asleep under an opiate, at which I suggested that I had better see him when he awoke and that she should call me again, which she agreed to do, but did not. I heard nothing further until his death on September 23.

Being interested in the case and astonished at such an outcome, I asked the attending physician for the particulars for I thought it would be of interest to dentists. He refused to give me a detailed report of the case on the ground that it was nobody's business, but he said to this effect: That some days after the man had been at my office, he was called to the patient's home where he found him with a swelling under his chin. There being some fever and great pain in the jaw, he was put to bed under an opiate and finally an abscess developed and broke, an opening appearing under the chin and two or three inside. He said he saw nothing unusual on the inside of the mouth where the teeth had been cleaned. The patient continued to grow worse, showing signs of septicemia, and died September 23.

Now, what lesson is to be learned from such an unfortunate termina-

*Read before the Miami Valley Dental Society, Oct. 3, 1921.

tion of such a simple beginning? I shall touch upon it as mildly as I can, my indignation being at a high heat.

We find the abscess developed almost in a classical manner, if I may put it that way. There was, so far as I can learn, nothing unusual in its development in the first stages, but it lies entirely in the treatment after about the time when the abscess had fully formed. We, as dentists, are continually meeting with fully-formed alveolar abscesses which we are successfully treating by following the dental technic. This case was treated in a medical way rather than a dental, and during this time another physician was called into consultation rather than a dentist. I do not hold the second physician in the least responsible, for the case was so far advanced that the diagnostic landmarks as to the original cause were smothered in pus and septicemia was well under way.

There is a wide difference in the dental and medical treatment of an alveolar abscess as shown in this case, at least. The dental treatment first, we well know, is vent for the pus either through the tooth or by the tooth's removal; second, frequent irrigation until the pus has ceased. The dental treatment is by mechanical procedure rather than by medicinal. The dentist in treating an abscess observes the paramount importance of drainage. This we have been doing for years with practically 100 per cent success; and the patient's condition is helped by a cathartic and exercise. They come to our offices in all stages of an acute abscess often reminding us of a lop-sided balloon, only one eye being sometimes visible. The pus is vented and recovery begins. It is seldom that the patient is seen at his home. The very exercise in getting to the dental office is beneficial.

Now, the medical treatment as seen in this case was just the opposite. The patient was put to bed and filled with a narcotic and the abscess was allowed to take its natural, unrestricted course and septicemia resulted as one would expect. The treatment had been directed more to the comfort of the patient than to the ravages of the pus. No mechanical effort whatever was made to vent the pus.

If a dentist had treated a case as I understand this was treated, it would have been looked upon by the dental profession as nothing more or less than a polite form of murder.

In conclusion, it has been intimated by the wife that the septicemia was the result of using infected instruments when cleaning the teeth. Now, you will recall that the patient was driven to me by pain. The pulp was dying in a tooth at the time. The cleaning was incidental, and let me interject here that all of my instruments and especially those which draw blood are cared for as thoroughly as if every patient that comes under my care is a syphilitic, for syphilis is no respecter of persons, although it prefers well-dressed people. The instruments are first cleaned under running water, then sterilized in alcohol before being placed away. All instruments of this class are kept in a formaldehyde instrument case when not in use. Thus, we have a double and certain sterilization of the instruments. During

the operation, the mouth is kept washed with a permanganate solution and when the cleaning is finished, the gums are painted with iodine.

An infection arising at the margin of the gums as in cleaning the teeth, and one arising in the body of the bone from a dead pulp presents such a different clinical aspect as to be easily recognizable by any first-year dental student. The infection in this case arose in the body of the jaw bone and not at the margin of the gums, and I am puzzled at the physician's error in the diagnosis of such a simple thing. I excuse him on the ground that he took the diagnosis of the family rather than the exercise of his own knowledge or judgment.

In over 18,000 prophylaxes in 34 years, following the foregoing technic, I have never seen a trace of poisoning and I cannot believe it now. Moreover, I have records of over 12,000 alveolar abscesses in all stages treated as above outlined without a single fatality.

Because of my high respect for the majority of the medical fraternity, I shall not let my tongue run free. There are medical men in our midst whom I profoundly honor and respect. I count them among my best friends. But what shall be said of any one who assumes dental pathology and assumes such responsibility yet allows a patient to fill up with pus from an abscessed tooth without making any effort to vent the same? He might at least wrap up the patient's head in a red flannel shirt and hasten the thing along. We, as dentists, look upon such a method of practice as medieval.

Isn't it rather significant that dentists the world over are treating incipient abscesses with practically 100 per cent success? More than that, they are taking cases so full of pus that they have advanced almost beyond recognition and are already in the throes of septicemia, but by the dental technic are restored to health in the great majority of cases. How long is the dental profession to remain asleep as to its real place in its service to humanity? It is high time that there is a closer relation between the physician and the dentist. When a case that strictly belongs to the dentist presents, by reason of his more thorough knowledge of the mouth, and his dental equipment, the case should be referred to him or he should be at least taken into consultation.

FURTHER STUDIES IN DETERMINING OXYGEN NEED DURING ANESTHESIA*

BY W. I. JONES, D.D.S., COLUMBUS, OHIO.

IT IS HELD by some that 90 per cent of all patients who undergo anesthesia for dental and surgical operations may be classed as standardized risks—or in other words they can be considered as from fair to good risks. So much so that their reception of an anesthetic can be rather definitely forecast and the induction, especially of nitrous-oxid-oxygen, standardized for all practical purposes.

In even the remaining 10 per cent, anesthesia can be induced and maintained more or less routinely in a standardized way, and the recovery period will in all probability be uneventful.

From my experience in many thousands of cases I am led to believe that hazardous risks were formerly the exception, especially in dentistry and oral surgery, but that recent advances have materially broadened the field of the operator and the anesthetist and have introduced the necessity of handling a far greater proportion of poor risks.

At the present time even the average odontologist meets, day in and day out, with patients who are anything but proper or safe risks under anesthetics, general or local; and it is therefore important and necessary that some way should be established for picking out such patients rapidly and accurately.

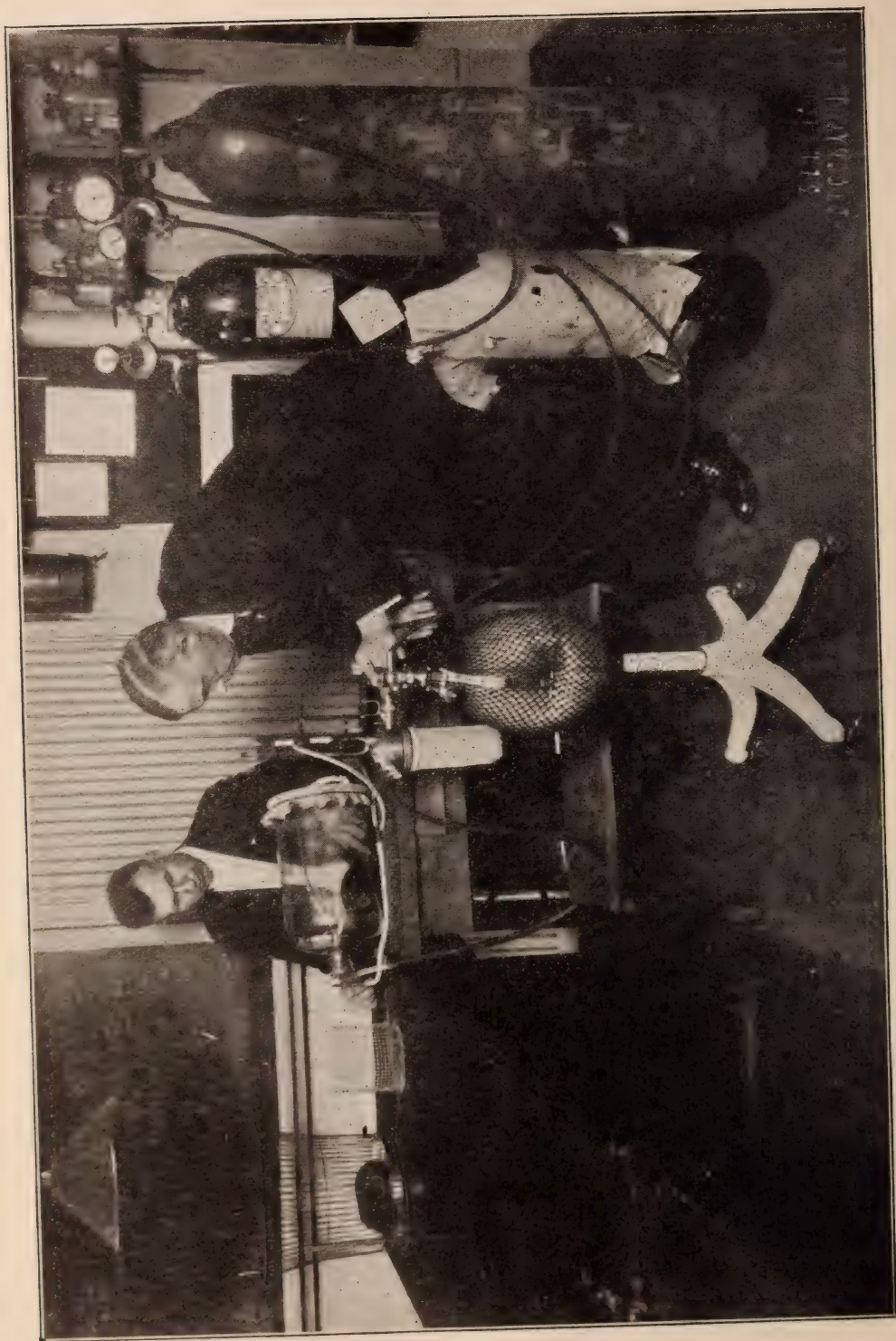
Because fatalities still occur with undiminished regularity in the chair and on the table, it is indeed important to discover, if possible, some routine method of obviating such fatalities as are at least preventable. The fact that deaths occur in the hands of even the most expert anesthetists would indicate that the conditions of patients has now become a prime factor in determining the risk involved in the operative procedure and in instituting safety-first precautions in anesthesia.

It can no longer be maintained either that because patients are too bad risks for general that they can be handled under local anesthesia with absolute safety. The latter method is now providing its full quota of fatalities, particularly in the operations of dentistry and the specialties, and its use demands the self-same precautionary safety-first evaluation of patient's condition as general anesthesia.

Nowadays it is not unusual for the dental operator to encounter patients with goiter, tuberculosis, heart and kidney diseases, respiratory complications and varying degrees of sepsis, anemia and toxemia. It is, therefore, necessary to formulate a routine plan by means of which to determine not

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We are indebted to *Amer. Jour. of Surgery* for use of illustrations for this paper.
—Editor.



only the fitness of these patients to take an anesthetic but more especially to determine also in advance how anesthesia may be given with the greatest safety to the bad risks encountered.

Before proceeding to the diagnostic phase of this subject it will be of interest to review certain researches regarding the relation of oxygen need to anesthesia and its further relation to the pathological conditions of poor risks.

The writer and Dr. McPeck, of the Department of Physiology of the Medical College of the Ohio State University, during the past few years have been conducting a number of experiments on animals for the purpose of determining the relative viability of the respiratory and cardiac systems under anesthesia, especially nitrous oxid-oxygen. Several theories have been advanced as to the way in which nitrous oxid produces anesthesia.

• Nitrous-oxid outside the body supports combustion, while in the tissues, other than the central nervous system, it acts like any other indifferent gas. Animals die when placed in it, seeds will not germinate in it, or plants grow, and the blood of an animal killed by it contains no oxyhemoglobin.

Nitrous-oxid has a special effect on the central nervous system by reason of the excluding of oxygen. If it were an indifferent gas, no effects should be obtained with a four-to-one mixture because ordinary atmospheric air is four parts of nitrogen and one part of oxygen.

Blood dissolves more nitrous-oxid than water, apparently for the reason that it is taken up by the lipoids of the corpuscles in much the same way that chloroform is.

It is introduced by way of the respiratory tract into the lungs, when it is distributed throughout the alveoli of this organ where it is taken up by the blood, but upon which it has no specific chemical effect, the resultant anesthesia being produced by some alteration of the oxygenating processes in the human body. This sub-oxygenating process beginning back in the pulmonary circulation where, owing to the supply of oxygen being cut off, the venous blood of the pulmonary artery passes unchanged into the minute radicles of the pulmonary veins, causing more or less stagnation, which results in a general anoxemic condition that may quickly develop into asphyxiation, unless much skill is used in the proper mixing of the gases, and a much closer watch kept over the respiration, pulse and color of the patient than is necessary when using ether.

The fact that nitrous-oxid anesthesia can sometimes be produced without any apparent or easily discovered cyanosis, does not prove that anesthesia is not the result of a diminished or altered supply of oxygen, because in fact it is the increasing or diminishing of the oxygen which determines the depth of the anesthesia, and profound anesthesia is frequently obtained, especially in the very anemic, or those with a low hemoglobin test, without the slightest apparent sign of cyanosis being present—so that those of limited experience may easily be mistaken in reading the signs of anesthesia. In other words, nitrous-oxid anesthesia is a general anoxemic

condition, whether cyanosis is present or not, in which the brain cells partake of the general anoxemia, thus preventing the recording of pain sensations, because the brain cells, like the pulmonary veins, only functionate in the presence of oxygen. If we had asphyxia to a lethal degree, there would be a total cessation of all the processes of life.

Nitrous-oxid when given to a lethal degree does not produce death by paralyzing the heart muscle as has been stated by some surgeons, but by its paralyzing effect upon the respiratory center. Of this we are convinced by large clinical experience of many thousands of administrations for all sorts of surgical operations, and more recently by laboratory experiments. Our object was to determine which was the first to succumb to the use of N_2O when used to a lethal degree. In all of our experiments the same phenomena were present in every case, *viz.*, when surgical anesthesia was produced and maintained, a beautifully rhythmical pulse and respiration were the result, but when oxygen was shut off and nitrous-oxid was used for the express purpose of producing the death of the animal, the blood pressure was suddenly increased, the respirations became more rapid and finally death ensued from asphyxia. In one case the heart continued to beat for as much as five minutes and forty-five seconds after the last gasp of respiration. Inasmuch as resuscitation was possible immediately after the cessation of respiration, the conclusion was reached that the viability of the respiratory center was less than that of the cardiac.

Several of the dogs had one or both of the vagus nerves severed; death from a too rich mixture of nitrous-oxid showed the same features, although impulses were no longer able to travel over the vagus.

The independent resistant element of the heart muscle to oxygen deprivation must be considered as a favorable feature. According to the experiments of Bert and Martin, death results from a lack of oxygen, rather than to the presence of the nitrous-oxid.

Another investigation was conducted by McPeck and the writer to determine some definite and fixed ratio between the hemoglobin index and the oxygen need during anesthesia and to demonstrate quantitatively as well as qualitatively the amount of oxygen following shock due to loss of blood. Anesthetists and operators have known for a long time that anemic patients and those who had lost a quantity of blood were poor anesthetic risks, but to our knowledge this had not been determined quantitatively before as to oxygen need with definite percentages of blood loss.

Guinea pigs were used as experimental animals on account of their small size and tractability. The pigs were confined in a bell jar with oxygen and nitrous oxid flowing through pressure regulating gauges and with a suction apparatus and a mercurial manometer connected up to prove that circulation of the gases was positive.

In all fifteen experiments were performed the blood was removed from the heart by aspiration and at intervals of from ten to twenty-four hours afterwards anesthesia was induced and maintained for an average of fifteen

minutes. From a study of charts similar to those to be illustrated we concluded that where the animal suffered a loss of twenty per cent of its blood content the amount of oxygen required was from two to three times greater than it was before exsanguination and that after a twenty-five per cent loss of blood the ratio was increased until the oxygen requirement was five times greater than it had been before.

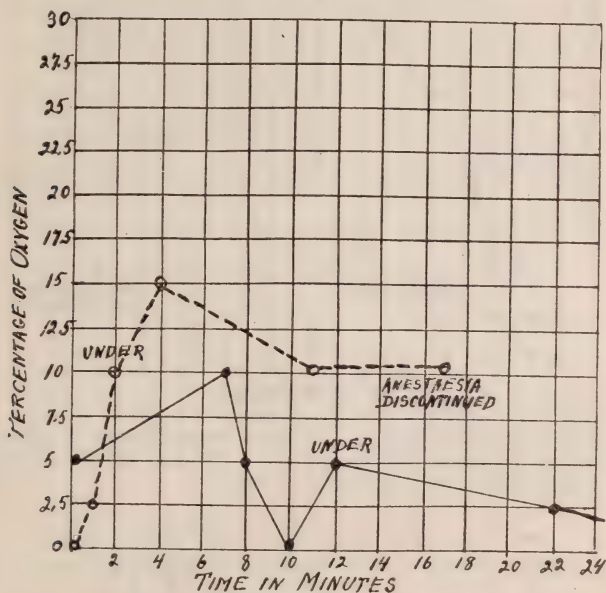


Chart A. Weight of pig 540 grams. Estimated blood content 41 cc. (1-13 of body weight). Amount of blood withdrawn 8cc. (20 per cent.). Oxygen requirement before exsanguination 6.5 per cent., after 12.3 per cent. Solid line represents oxygen need before and dotted line after exsanguination, in all charts.

The results of these experiments bear out those of W. B. Cannon in the war zone in which he found that shocked soldiers readily died under anesthesia, and that even nitrous oxid-oxygen did not save life unless given with enough oxygen to meet the patient's requirement. Thus in first degree shock Cannon found the oxygen need to be from twenty to thirty per cent, in secondary shock from thirty to forty per cent, and in third degree shock, from forty per cent upward.

It is the factor of oxygen lack that must bear the burden of blame for untoward complications resulting from nitrous oxid-oxygen anesthesia. Oxygen starvation means acidosis and a slight increase in acid products is dangerous in cases with hemoglobinemia, shock, cachexia or starvation, toxemia, cardio-renal changes, pulmonary lesions and various other conditions of disturbed metabolism in which there is frequently excess of acid products and consequent tendency to acidosis.

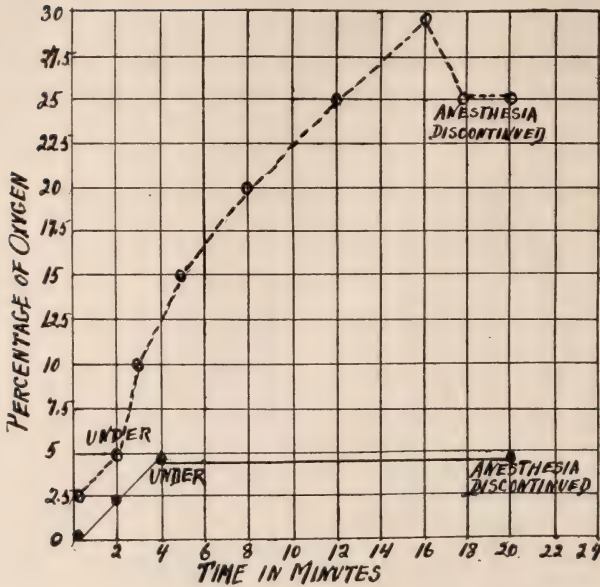


Chart B. Weight of pig 500 grams. Estimated blood content 37 grams (1-13 of body weight). Amount of blood withdrawn 7.5 cc. (20 per cent.). Oxygen requirement before exsanguination 5 per cent., after 18 per cent.

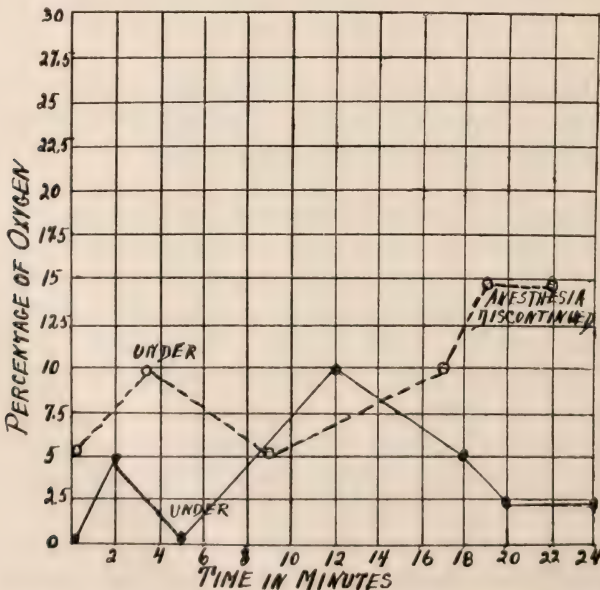


Chart C. Weight of pig 590 grams. Estimated blood content 45 grams (1-13 of body weight). Amount of blood withdrawn 9 cc. (20 per cent.). Oxygen requirement before exsanguination 4.9 per cent., after 9.3 per cent.

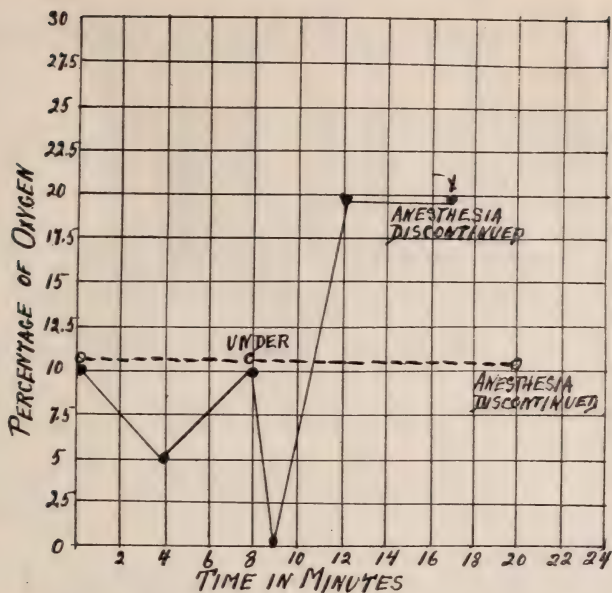


Chart D. Weight of pig 531 grams. Estimated blood content 40 grams (1-13 of body weight). Amount of blood withdrawn 3 cc. (7.5 per cent.). Oxygen requirement 1 to 1. In this case the animal was so young that it was difficult to maintain satisfactory anesthesia.

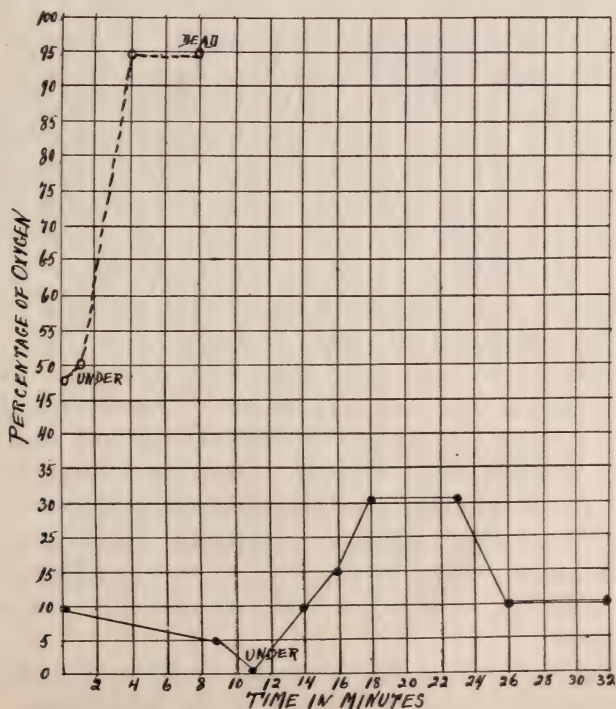


Chart E. Weight of pig 625 grams. Estimated blood content 48 grams (1-13 of body weight). Amount of blood withdrawn 12.5 cc. (25 per cent.). Oxygen requirement before exsanguination 15.5 per cent., after 57.5 per cent.

Case No.	Condition	Breath Holding Test	Pulse Rate	CHART F. Blood Pressure		Pulse Pressure	Hemoglobin Index	Oxygen Per Cent.	Oxygen Increase Per Cent.
				Sys.	Dias.				
1.	Diabetes.....	16 sec.	108				80		
2.	Thyroid.....	10 sec.	110	142	95	47	70	6.	50.
3.	Thyroid.....	10 sec.	150	145	67	78	70	8.	100.
4.		25 sec.	112	123	82	41	70		
5.	Anemia.....	15 sec.	96	152	74	78	60		
6.	Mitral Regurgitation	40 sec.	92	115	65	50	(Compensating heart)		
7.	Mitral Murmur.....	14 sec.	110	182	62	120	70		100.
8.	Tuberculosis.....	12 sec.	110	98	78	20	70		
9.		15 sec.	100	104	104	40	80		
10.	Pus Diabetes.....	20 sec.	104	120	62	58	70		
11.	5½ per cent Sugar..	35 sec.		(Operation for gangrene)				10.	
12.	Sepsis.....	12 sec.	94	148	100	48		8.	
(Bad teeth; large amounts of pus; giant-cell epulis of lower jaw)									
13.	Acute Infective								
	Cellulitis.....	15 sec.	120	(Temperature 102.4°—For every degree above normal temperature the baso-metabolic rate is increased 10 per cent.)					

Nearly all these patients may present one or more of the following signs and symptoms:

1. Color changes such as cyanosis or pallor.
2. Hemoglobin deficit.
3. Changes in the respiratory rhythm as shown by various grades of dyspnea, apnea, with or without cyanosis or anoxemia.
4. Tachycardia or bradycardia.
5. Lowered carbon dioxid tension in the alveolar air and arterial blood.
6. Acetonuria, glycosuria, or albuminuria.

In nearly all these conditions the hemoglobin reservoirs are low and the final oxydations of the acid derivatives of metabolism are incomplete. These acid products are poured into the blood stream in excess and the protective mechanism of the human economy is subjected to an abnormal strain. The neutrality of the blood is maintained almost to the end but with ever increasing difficulty. Lungs and kidneys are hard pressed to eliminate the acids. Thus in diabetes the carbon dioxid tension is depressed to one-half the normal degree. In cardiac disease the dyspnea there is increased formation of acid bodies as shown by the lowered carbon dioxid tension of the alveolar air. When cyanosis or apnea accompanies cardiac conditions there is either oxygen lack or an imbalance of the oxygen carbon dioxid ratio.

These patients with cardio-renal changes are among the most serious risks which the anesthetist or dental operator meets. The condition is especially precarious because slight degrees of myocarditis or interstitial nephritis often come to operation unrecognized. These patients demand more than the normal volume of oxygen in their tidal air and slight degrees of asphyxia may fatally increase acidosis or produce a disastrous degree of heart strain. The patient may avoid decompensation at the time but it may be sudden and fatal after operation. Pulmonary lesions and hemorrhagic conditions are not so serious as they can be more readily influenced and bettered by judicious oxygenation and rebreathing to conserve carbon dioxid stimulation.

In meeting and solving the presenting problems the anesthetist and dental operator has the following diagnostic methods at hand. The history and physical examination bring out certain pathological conditions, while the pulse rate, blood pressures, pulse pressure, heart load, breath holding test

and hemoglobin index bring out others. These later when charted serve to fix the attention of the anesthetist and operator especially on oxygen need.

Stange, of Petrograd, considers the condition of the heart as the best indication of the patient's ability to withstand general anesthesia. To determine the condition of the cardiac muscles Stange recommends the so-called respiratory test that is the ability to abstain from breathing for some time. Healthy persons can do this from thirty to forty seconds, while those with a weak heart muscle can hold their breath at most from ten to twenty seconds. The test is very simple. The patient sitting at ease takes a deep inspiration and closes the mouth, the nostrils being compressed to avoid involuntary expiration; and while the patient holds the breath as long as possible, the seconds are counted. If there is any doubt as to the exact breath holding capacity of the patient the test may be made more severe by evaluating several breath holdings in succession.

While Stange seems to have had no suspicion that his test was based on an apnea due to acidosis, nevertheless he reported observation on a number of chronic diseases in which he found the duration of voluntary apnea to be abbreviated in about the degree in which acidosis is known to occur from the results of other observers, especially Yandell Henderson. Thus voluntary apnea due to myocardial degeneration or acidosis and diagnosed by this simple respiratory test will serve as a warning to the anesthetist and operator in handling diabetic, cardiac and renal risks.

There are other conditions in which the breath holding capacity is also lowered such as in low or high pulse pressure and decreased hemoglobin index. It has also been found that an increased pulse rate, along with other symptoms may indicate increased metabolism and increased oxygen need.

In conclusion it may be said that the anesthetist and dental operator who will routinely subject all his patients to the examination indicated and practiced and will chart the figures resulting, will be in a position to make a differential diagnosis of what relation apnea bears to the pathological condition of the patient and what oxygen requirement is needed for safe anesthesia.

DIAGNOSING THE PERIODONTAL DISEASE

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(Written for THE DENTAL SUMMARY)

SCIENTISTS IN RECENT YEARS have been conducting researches on so-called pyorrhea alveolaris, with particular stress on the treatment and clinical aspects of the disease. They have also probed in the bacteriological and pathological field. Noteworthy authorities have written lengthy discussions on the nomenclature of the periodontal disease; yet very little attention has been given by dentists in general to the bacteriological or pathological viewpoint, and to the proper nomenclature. The discussions written on the bacteriology, pathology and terminology are seldom accepted by the average practitioner as possible procedure toward a diagnosis.

Personal observations have shown that some dentists are prone to follow treatments and clinical diagnosis from descriptive literature accompanying proprietary drugs or compounds. It is obvious that this is a wrong course for the dental surgeon to pursue. The drugs or compounds may help to cure, alleviate or do all that is claimed for them; yet to know just what the case presents, and what drugs will actually combine or convert the disease to a cure, pre-supposed: *First*, a correct diagnosis, with clinical symptoms, and then a selection of a remedy best suited for the particular infection.

It is not the writer's intent to suggest any new terminology of the disease, simply to emphasize that which has been formulated by Dr. M. N. Federspiel. The use of the microscope in determining the bacteria present, the untiring efforts devoted to the correct interpretation of the symptoms, the clinical picturing of past cases, and the terminology which describes the conditions of the disease is proper and fitting to correctly diagnose a case of the periodontal infection.

Using Dr. Federspiel's terminology, "suppurative proliferated gingivo-osteo-pericementitis" is a disease affecting the gums at and about the cervix of the teeth, which causes flow of pus, a shrinking of the gums from chronic gingivitis; absorption of the alveolus, and a separation of the cementum from the alveolar wall with the destruction of the periodontal membrane. The disease no doubt begins from the gingival margin. It is difficult to differentiate marginal or deep-seated gingivitis from ordinary periodontal infection, because some phases of gingivitis may take the course and character of the latter. It is therefore at this stage very helpful to culture the case, or to make a direct smear to determine the amount and character of the infection.

TERMINOLOGY

Gingivitis is described as an inflammation of the soft tissues through which the teeth erupt, while an inflammation of the mucous membranes

of the oral cavity is known as stomatitis. Acute marginal gingivitis is a condition existing about the cervix of the teeth and septum. It may become progressive, penetrating deeper, developing deep-seated gingivitis. In this stage the connective tissue fibers of the periodontal membrane are affected, involving the marginal growth and transeptal group, developing pericementitis. The destruction of the fibers at the free margin of the gum may progress to an inflammatory condition, producing proliferated changes with a loss of the elasticity of the circular ligament. This condition has been described as gingivo-proliferated pericementitis.

The result of the increase in the number of cells at this site, produces pressure upon the nerve endings causing extreme pain. The involvement of the periodontal membrane, and the separation of the cementum with invading micro-organisms which causes suppuration and attacking the alveolar process develops ostitis.

Thus the term "pyorrhea alveolaris" is more satisfactorily described by the terminology; "suppurative proliferated gingivo-osteo-pericementitis," in which one, or all the stages of the disease are pictured. This appears to have a clearer meaning, for the reason that the terms are based on anatomical and pathological foundations, whereas the term "pyorrhea alveolaris," used freely among dentists, suggests a series of empirical conditions. But to the medical profession and allied scientists it suggests no picture except that it is understood to be a disease concerning the teeth and gums.

"Periödontoclasia" is a term more recently given to the disease of the gingivæ, alveolus, cementum and pericementum or the supporting tissues of the teeth. This term also has a much more plausible meaning than "pyorrhea alveolaris" or "Riggs' Disease," etc., and describes to a great extent a picture of the periodontal disease. Such terms as "pericementoclasia" and "alveoloclasia" have also been suggested.

BACTERIOLOGY

Under this heading consideration is given; primarily, to the staphylococcus, streptococcus, spirochete, bacillus fusiformis, ameba; and, secondarily, to the pneumococcus bacilli of various types, and putrefactive organisms.

Microscopical examinations are accomplished by direct smears, although some of these organisms require incubation of the cultures. The use of the platinum loop is well suited for the transfer of the organisms present to the slide or sterile culture tube; also a small piece of the affected membrane can be taken with ordinary dental cotton pliers and smeared. The smear is dried, fixed over the flame, and then stained.

The staphylococci are the organisms most commonly found in boils, abscesses, and similar suppurative infections, existing in several varieties, one of them being staphylococcus pyogenes aureus, and another the staphylococcus pyogenes albus. The staphylococci pyogenes aureus are more widely concerned in the disease about the gums and tissues of the

oral cavity, and is a spherical organism usually found in irregular masses, similar to grape clusters.

The streptococcus likewise is spherical in shape, differing from the staphylococcus inasmuch as the units are connected in long and short chains, although at times it appears to be in masses. The short-chain streptococci are the type usually met with in normal mouths, while either short or long-chained types may be virulent. The mucous membrane is no doubt a favorable place for the streptococci and when by general or local causes the resistance of these tissues is lowered, invasion is sure to follow.

The staphylococci are stained by the anilin dyes, while the streptococcus from man takes a Gram stain, although some streptococci of animals have been Gram-negative.

The virulence of different strains of streptococci is a much disputed subject. It has been proven by bacteriologists that streptococci taken from septic tissues and discharges in man are more dangerous to man than organisms such as saprophytes on the mucous membranes. The streptococci-pathogenicity for man is no doubt far greater than any other organisms. Few affections are totally absent from streptococci, and many diseases are associated therewith.

The spirochete is a spiral organism possessing five convolutions, slender, ranging in length from eight to twelve microns: Although it may be said to be non-pathogenic, the presence of this organism has a marked influence on the periodontal disease, and yields only to treatment in such cases by a specific drug or treatment. The spirochete is anærobic, and stained by Löffler's stain. Kolle has advanced the theory that the active causative factor of the periodontal disease is a spirochete that resembles the one found in relapsing fever, and in examining numerous cases he has found a spirochete ten to twelve microns in length, possessing five convolutions. This organism is similar to the *spirochæta buccalis*, and which he names as the *spirochæta pyorrhœica*.

Bacillus fusiformis, an anærobic organism is long and slender, having pointed ends with the midpoint dilated. It is non-motile and Gram-negative, taking Löffler's stain. That the spirochæte found with *B. fusiformis* are closely associated, or that the two are different stages in the life of the same organism, is a much disputed topic among investigators.

The ameba of the gums (*entameba gingivalis*) is similar to the *E. histolytica*, being smaller, less active and motile. The discovery of the ameba associated with the periodontal disease, has promulgated many discussions among investigators. Several authorities consider the *E. gingivalis* the cause of the affection. The ameba is usually present in the disease, although there is no definite relationship between the ameba and the periodontal disease. Patients suffering from the disease, and have been benefited by emetin, leads one to the conclusion that

the ameba is responsible for the disease; but other reports on the subject are conflicting, and deny any benefits therefrom. The writer's experience with emetin has been of no avail, and consequently the conclusions are that the ameba has no specific causative relationship in the periodontal disease.

The pneumococci, bacilli of various forms, and putrefactive organisms have no specific role in the pathology of the disease. These organisms found in septic pockets around the teeth are pathogenic and capable of producing acute or chronic inflammatory changes in the tissues under favorable conditions; however, it is probable that they never gain a foothold in the periodontal disease.

PATHOLOGY

The inoculation of the periodontal disease does not take its course except where there is a local trauma of the gum margin. Later it attacks the periodontal membrane, and with the presence of microorganisms, eventually breaks up the tissues, causing them to slough. Local infection, a result of the lowered resistance of the tissues, will tolerate and allow an establishment of an inflammatory process.

The cause of the periodontal disease is a direct infection of microorganisms. The disease is rarely due to a single cause, and in the majority of cases it is caused by one major factor and several contributing ones. Normal healthy tissues such as mucous membrane is a fortification against the invasion of bacteria, while the smallest of abrasions is an entrance open for infection.

Usually the beginning of the periodontal disease is in the teeth which bear the brunt of mastication. It begins from the gingival margin, destroying all tissues that may be in its path, affecting the periodontal membrane, alveolus, and even causing pericemental abscesses, a result of an acute sudden recurrence of symptoms with exuberant pus formation in the pockets, and where drainage is obstructed, pockets are formed in the sub-gingival space, allowing food particles to collect, favoring inflammation and bacterial growth, by which the characteristic putrefactive odor typical of the periodontal disease is developed. The gums show a reddening from inflammation of the labial and lingual sides, and in the incipency of the disease, bleeding of the gums is provoked from the slightest injury, due to the granulation of the tissues. The inflammation starts a serous fluid oozing from the affected areas, causing a precipitate or serumal deposit. The gums then retract, leaving a sensitive dentin due to exposure, and finally the sloughing of the periodontal membrane. Ulceration follows early and progresses quickly once marginal gingivitis is established, appearing on the inner gingival folds. The lymphatics follow the blood vessels, paralleling the long axes of the teeth, take up the septic material, carrying it apically, permitting bacteria to be absorbed into the lymphatics, producing various systemic infections.

LOCAL CAUSES

Chronic irritation which may be caused by tartar, defective dental

work, caries, and malocclusion are the predisposing causes of the infection and are the local causes familiar to the dental profession.

Salivary calculus of the soft, light colored type, causes recession of the gums, presenting a surface for the deposit of serumal calculus, and the ragged surfaces of the enamel at the gingiva of newly-erupted teeth afford a favorable breeding place for bacteria. Extensive fixed bridge-work and inefficient removable bridgework, which exerts undue stress, produces changes and finally a rupture of the periodontal membrane, thereby making it susceptible to infection. Crown bands impinging on the gingiva are irritants and set up inflammation, while unfinished gingival margins of fillings, faulty contacts either from caries or lack of orthodontic treatment, are the causes of many cases of the periodontal disease. Improper methods and habits formed in cleaning or brushing the teeth are very often sources of irritation, while uncleanness is equally as harmful as excessive brushing. Toothpicks used forcibly and extensively over a long period of time are likely to be injurious and cause inflammation.

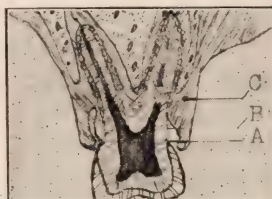


Fig. 1

Fig. 1—(a) Gingival margin. (b) Normal attachment. (c) Gingival epithelium, connective tissue and capillaries.

From the normal attachment of the gingiva (*Fig. 1*), and the area which is composed of gingival epithelium, connective tissue and capillaries forming a pocket, an ideal opportunity is offered for the growth and entrance of micro-organisms directly into the blood stream; and when the general resistance is low, and as long as this condition is allowed to persist, there is a permanent opening for micro-organisms which produce their characteristic pathology, this area becoming the opening for systemic infection.

SYSTEMIC CAUSES

Constitutional disease and faulty metabolism increase the susceptibility of the gums to infection, and often cause the destruction of the alveolar process. Such affections as anemia, metallic poisoning, diabetes, alcoholism, gout, pregnancy, lactation, tuberculosis, syphilis, diseases of ductless glands, blood diseases, scurvy, chronic infection, acute infectious diseases, infected tonsils, etc., are sources for lowering of the resistance of the gums to the point where they may take up micro-organisms.

With patients afflicted with gout or diabetes, having defective or unsanitary oral cavities, the power is lessened to ward off such diseases as the periodontal disease, tuberculosis, pneumonia, etc. When in the case of diabetes, the urine is free from glucose, the response of treatment of the periodontal disease is quickened. Any functional disturbance then which will lower the resistance of the gums, cannot respond to treatment unless the functional disturbance is alleviated; and furthermore the gums may improve only when oral hygiene is scrupulously followed, while the slightest deviation from cleanliness, or when the resistance is lowered by fatigue will cause a recurrence of the disease.

DIAGNOSIS

A diagnosis of the periodontal disease is vastly more than a mere recognition of pathological processes. When the bacteriological and pathological conditions are recognized, determining the etiological processes involved, it is then that the diagnosis is founded. Treatment is instituted from a diagnosis; but if that be inefficient, then the treatment is not complete. Diagnosing the periodontal disease is possibly more abused than any other procedure in dentistry. It is true that when pressure is applied to suspected gums, pus will exude, and the gums show a reddening because of inflammation due to irritation; but if the whole weight is based upon this clinical etiology alone as a diagnosis, knowledge of the treatment is limited. Surgeons in suspected cases of appendicitis will first get as much of the history of the case as possible, and then make leukocyte counts, etc.; so it behooves the dental surgeon to do likewise in his determination on the periodontal disease.

Revelations through the microscope have explained the phenomena of bacterial life, and their toxic effects upon the tissues. Roentgen-ray pictures have also revealed the mysteries of pathological and bacteriological disturbances. These two instruments coupled with the knowledge of bacteriology and pathology will enlighten the operator and enable him to establish his diagnosis and select a treatment to act upon the causative factors.

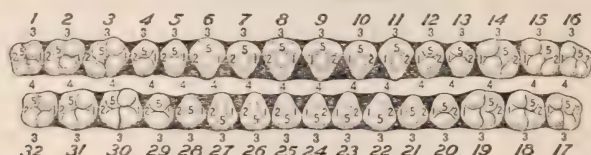
One of the first essential procedures toward the diagnosis is to make a case-history record as elaborate or simple as the conditions warrant. The following case-history record has served well in the hands of the writer. The more elaborate does nicely where time and expense is no object, while the simple serves for all the established items.

CASE HISTORY AND RECORD OF

M.....	Date..... 19.....
Address.....	Telephone.....
Occupation.....	Referred.....
PAST OR PRESENT DISEASES	
Antrum Inflammation.....	Meningitis.....
Anemia.....	Nephritis.....

Appendicitis.....	Nervous affections.....
Arteriosclerosis.....	Neuralgia.....
Arthritis.....	Neuritis.....
Cardiac Diseases.....	Obesity.....
Catarrh.....	Orthodontic Treat.....
Diabetes.....	Pneumonia.....
Diphtheria.....	Pyorrhea Alveolaris.....
Ear Diseases.....	Rheumatism.....
Eye Diseases.....	Sciatica.....
Facial Neuralgia.....	Septicemia.....
Gonorrhea.....	Syphilis.....
Gout.....	Sore Throat.....
Headaches.....	Stomach Disorders.....
Indigestion.....	Tonsilitis.....
Influenza.....	Toothaches.....
Insomnia.....	Tuberculosis.....
Malaria.....	Typhoid Fever.....
Measles.....	Vincent's Angina.....

TEETH RECORD



PHYSICAL EXAMINATION

Weight.....	Height.....	Age.....	Color.....
Chest.....	Blood pressure.....	Lung Sounds.....	
Heart Sounds.....	Pulse.....		
Respiration.....	Temperature.....		
Deformities.....			

X-RAY FINDINGS

No.....

Root Fillings.....	Pulp Stones.....	Fractures.....
Devital Teeth.....	Impacted Teeth.....	

URINALYSIS

Quantity.....	Color.....	Odor.....
S. Gravity.....	Albumen.....	Glucose.....
Blood.....	Pus Cells.....	Casts.....

BACTERIOLOGICAL FINDINGS

SPUTUM

Color.....	Odor.....
Consistence.....	Blood Cells.....
T. B.	Pus Cells.....
Strep.....	Staph.....
Casts.....	Bacilli.....

BLOOD

Hemoglobin.....	Macrocytes.....
Coagulability.....	Microcytes.....
S. Gravity.....	Normoblasts.....
R.B. C. Count.....	Poikilocytosis.....
W. B. C. Count.....	Parasites.....

L.Lymphocyte.....S. Lymphocyte...
 Eosinophile.....Basophile.....
 Polymorphonuclear.....

BACTERIA FROM ORAL CAVITY

Spirochæte.....B. Fusiformis.....
 Streptococci.....Staphylococci.....
 Ameba.....Pneumococci.....

SYSTEMIC BACTERIOLOGICAL FINDINGS

Wassermann Test.....Gonorrhea.....
 Widal Test.....

DIAGNOSIS.....

TREATMENT.....

PROGNOSIS.....

REMARKS.....

DISCHARGED.....19

This record will register past pathological processes, and at the same time give the essential data of the present physical or systemic conditions. A thorough examination is then made of the oral cavity, and all malformations, cavities and dental work are recorded on the chart, together with a set of X-ray findings. The X-ray pictures will show the amount of destruction of the tissues, irritants, abscesses and faulty root canal work.

The Röntgen-ray pictures are an important subject here, inasmuch as they are used for diagnostic purposes. Usually a set of X-ray mounts will give facts relative to the conditions of the alveolus in the periodontal infection; yet often they prove of no value, and confuse the operator as to the truthful conditions. But with a well-made case-history record, together with clinical symptoms, the radiographs can be more intelligently interpreted. Many times a radiograph will show a pocket, and the patient gives a history leading to the conclusion of a periodontal infection, and the operator goes no further into detail. This condition may be merely salivary calculus, and when removed will clear up the case, with no other medication. It then becomes evident that a careful study of the X-ray pictures must be given, in order to read the "fakes" that the pictures will show. A case-history record in conjunction with the X-ray pictures is essential to a correct diagnosis.

The physical examination may seem superfluous, yet it is important, because it gives the operator facts which will govern his diagnosis and treatment. Often the practitioner will discover a deviation from the normal of which the patient was unaware. If this part only serves as a clinical record, it is important because accumulations of these will later allow the operator to determine the types of patients afflicted with the disease. Advancements in the medical world have been made by the hospital records. These statistics of course were collected where facili-

ties for keeping records always surpassed those adopted by individuals. Dental infirmaries are incidentally used as centers of research, but are largely conducted for furnishing experience to students. But in fairness to dental colleges, data collected in hospitals is not always connected with medical schools. The latter institution usually have larger funds to further their needs. At present, however, dental research is being adopted by not only dental colleges, but by hospitals, private manufacturing concerns, and public health boards. But as a whole, these concerns and institutions have not taken dentistry seriously enough to establish permanent records. Both private and public records for scientific research are advisable in order to collect data, which will later afford ample material for advances in dental research and treatment.

Diagnosing bacterial processes is as important, if not more so, than by the Röntgen-rays. Often in severe, long standing cases of the periodontal infection, there is a marked increase in the leukocytes. Pus taken from suspected pockets shows a wide variation of bacteria, the more predominant being the streptococcus, staphylococcus, *B. fusiformis*, spirochæte and putrefactive organisms. In chronic cases where much destruction has taken place microscopical examination reveals the *B. fusiformis*, spirochete, streptococcus, staphylococcus, with the streptococcus and staphylococcus in greater numbers than either the spirochæte or *B. fusiformis*; although in some cases there is the reverse of this condition. In these conditions the treatment must be a specific drug or remedy to act upon the organisms. In such cases even though the spirochetæ or *B. fusiformis* be considered of lesser importance, they must be removed as well as the other organisms to obtain permanent relief of the disease. Mild cases of the disease often can be treated successfully by instrumentation and mild germicidal agents as local treatments, but many cases of long standing require not only local but systemic treatment.

It is often very helpful to make pathological-tissue examinations to determine the amount of destruction. With this examination the operator will then know whether he can, by his therapeutic agents give relief. Often he will see that only surgical procedure will accomplish results, because where destruction has gone beyond control, therapeutic agents as a cure are impossible and useful only as a check against further destruction.

 General pathological conditions also must be considered. Some investigators claim that the periodontal disease is a direct infection caused by systemic disturbances accompanied by lowering the vitality of the tissues in the oral cavity to take up the infection. In that case any general disturbance must be removed as well as the local processes.

When in any doubt of general disturbances, such as diabetes, kidney diseases, rheumatism, etc., an urinalysis should be made. Chronic cases of the infection have been cleared up by the detection of glucose, pus, etc., in the urine. In cases of diabetes and the periodontal infection

associated, the urine must be free from glucose. The diabetes must first be eliminated before relief can be effective on the periodontal disease.

 Bacteria of the mouth which give up their toxins are absorbed by the lymphatics and arterial systems. This is not strange, after we have become familiar with the anatomy and physiology of the teeth and surrounding tissues. Men of international fame and reputation have demonstrated the lymphatics of the teeth complete as well as the arterial and nerve supply. It is well to remember that usually the lymphatics follow the arteries, and that the internal and external carotids are free distributors in the oral cavity. One needs only to recall anatomy to realize the vastness of territory these vessels cover. Then it becomes evident how easily the periodontal infection can produce alarming systemic results, and how surprisingly these can be revoked upon the successful treatment of the periodontal infection. The writer's belief is that the periodontal disease is direct infection, usually associated with some general disturbance. The systemic conditions are the exciting cause; that is, the general health of the body, including the oral cavity is lowered. Small abrasions and injuries allow bacteria to enter and cause a direct infection. It is possible and probable that there may be no general disturbance, and yet the periodontal infection be contracted.

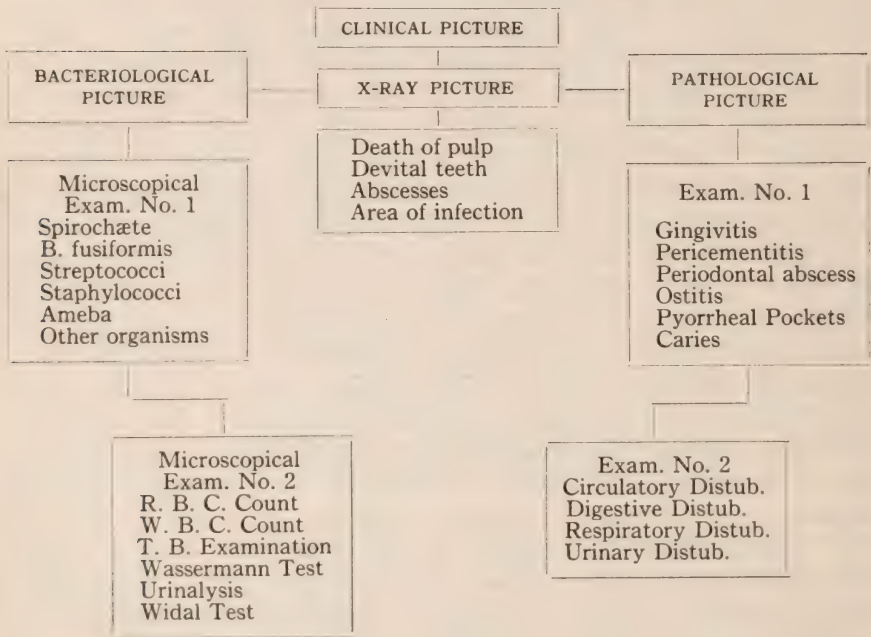
Acute or chronic forms of the disease are produced by predisposing and direct causes. Often the direct is associated with contributing, and infective factors. The direct or contributing causes may have been nervous disturbances, causing faulty metabolism, resulting in the destruction of the tissue cells. This condition must be corrected before the capillaries can anastomose to regenerate new cells. It is the writer's belief that systemic disturbances cannot be dissociated from the treatment of the periodontal disease. The relief and cure depend upon the removal of infection and favorable conditions for repair of the tissue cells. Susceptibility to infection in the periodontal disease depends upon the resistance of the tissues. This conforms to the porportion of active leukocytes, assisted by opsonins, agglutinins and bacteriolysins reaching the tissues, and erythrocytes and lymph to build cells. Therefore the resistance defined is the arterial blood reaching the tissues in sufficient quantities and rapidity to destroy infective micro-organisms, before they can form a lesion, and before the leukocytes lose their activity in the venous blood. Then circulation must be equalized, improved, and that requires assimilation and metabolism.

As previously stated treatment is instituted when a diagnosis is complete. It is not the writer's intent to enumerate any lengthy discussion thereon, because his belief in treatment is varied according to his diagnosis; in other words, not any one therapeutic or surgical procedure is a justified treatment in all cases of the periodontal disease. If one finds the streptococcus and staphylococcus in the majority, then seemingly the best suited remedy for such a condition is a drug that will

act upon these organisms. Then again if the microscopical examination reveals the spirochæte or *B. fusiformis*, a specific drug such as salvarsan or neosalvarsan, used in some cases locally and others systemically, is recommendable. Surgical procedure cannot be recommended highly enough; but absolute sterilization must be associated in its most minute detail.

The patient also can help himself and the dental surgeon by following the most rigid laws of oral hygiene and instructions. Open air, mouth and physical exercise, wholesome food, and free elimination of waste materials is a big asset in the treatment of the disease.

DIAGRAMMATIC DIAGNOSIS CHART



753 Brandywine Ave.

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THE BABIES' DISPENSARY AND HOSPITAL DENTAL CLINIC
FOR PRE-SCHOOL CHILDREN, CLEVELAND, OHIO*

BY J. HATCH CLARK, D.D.S., CLEVELAND, OHIO.

THE BABIES' DISPENSARY and Hospital Dental Clinic for pre-school children was opened on July 26th, 1920. The clinic is open daily, with the exception of Sundays and holidays, from 9 A. M. to 12 M.

The first procedure in treatment is a complete examination of the oral cavity, succeeded by an oral prophylaxis, the removal of deposits or stains from the teeth, and treatment of the mucous membrane when infected. This is followed by the restoration of carious teeth with cement and amalgam fillings. Teeth are extracted in the Dental Clinic only when it is necessary to relieve pain immediately. All cases of extraction which would cause suffering and a consequent frightening of the child, unless performed painlessly, are referred to City Hospital so that nitrous oxid and oxygen may be administered as an anesthetic. It is our policy whenever possible to complete all restorative treatment before extracting infected teeth, as this helps to prevent the fear of further suffering.

Patients who present themselves first to the dental clinic are referred to the general clinic for a physical examination, so that all defects may be discovered and a complete record of each case kept on file.

The curative treatment performed in the dental department resolves itself into preventive treatment, for in the restoration of carious and the extraction of abscessed teeth we are eliminating foci of infection which might otherwise cause rheumatism, heart lesions and many other organic disturbances.

†For the year ending December 31, 1921, we had 417 individual patients with a total attendance of 1786. The highest daily attendance was 16, the average daily attendance was 5.91. It may be interesting to learn that the maximum time for a sitting is 30 minutes. This is also about the minimum time in which any restorative work may be properly accomplished. When extensive operations are being performed an attendance of six constitutes a morning's work.

In the year of 1921 we performed

465 oral prophylactic treatments,

668 amalgam restorations,

99 cement restorations,

252 extractions,

655 miscellaneous treatments such as the application of counter irritants, analgesics, lancing of abscesses and the treatment of sockets following extractions.

*Read before the Central States Pediatric Society, at the annual meeting, Cleveland, O., November 7, 1921.

We have learned that 91.1% of *pre-school children* examined in our clinic had dental caries.

71% had more than five cavities.

34% had 10 or more cavities.

The average number of cavities for each patient was 8+.

The largest number of cavities occurring in one mouth was 25, presented by a boy 5 years of age (Irish parentage).

59.8% had abscessed teeth ranging in number from one to nine teeth affected.

14.9% were in need of orthodontic treatment.

14.2% presented teeth affected by chemical erosion.

53% of the children were males and 47% females.

The average age was 4+ years.

The following comparative figures are not to be taken as representative of Cleveland but as the result only of the examination of cases admitted to our clinic.

Jewish—The Jewish children represent 21.7% of our cases.

100% presented carious teeth (one case with only one tooth affected).

12.5% needed orthodontic treatment.

The average age was 4+ years; the average number of cavities was 8.7.

Colored—The colored children represent 17.6% of our cases.

76.6% presented carious teeth.

16% needed orthodontic treatment.

The average age was 3.8 years; the average number of cavities was 5.5.

American—The children of white American parentage represent 16% of our cases.

91.6% presented carious teeth.

20% needed orthodontic treatment.

The average age was 4+ years; the average number of cavities 8.6.

Italian—The Italian children represent 10.2% of our cases.

86.6% presented carious teeth.

6.6% needed orthodontia.

The average age was 4½ years; the average number of cavities was 6.8.

Polish—The Polish children represent 8.8% of our cases.

92.3% presented carious teeth.

23% needed orthodontic treatment.

The average age was 4½ years; the average number of cavities was 7.9.

During the past year we had an opportunity to examine and perform dental operations for twenty-one children from St. Anne's Orphanage. These children were of mixed nationality; no particular attention had been given to the care of their teeth, but they had been reared with regularity of habits, namely, rest, recreation and diet.

61.9% presented carious teeth.

14 % needed orthodontic treatment.

1 case with an abscessed tooth.

- 1 case of chemical erosion.
- 71% male.
- 29% female.
- Average age was 3.3 years.
- Average number of cavities 2.7.

In this brief sketch I have endeavored:

1. To outline the kind and number of treatments performed;
 2. To show the high percentage of dental caries and the great need of dental service for pre-school children;
 3. To show the percentage of caries among different nationalities that represent fixed types due to inter-marriage and habits of environment;
 4. To compare home reared and institutional reared children.
- 2500 E. 35th St.

Sterilizing Cotton Attached to Broaches

Dr. Rhein, of New York, I understand, has his secretary use sterilized rubber gloves when attaching cotton to broaches to be inserted into root canals. My method is (after the cotton is attached to the broach by the aid of the fingers) to saturate it in water and then hold over a spirit lamp flame till the water disappears in steam.

A bacteriologist, after seeing a demonstration in my rooms, expressed the view that the cotton was undoubtedly made sterile by the method shown. Thus any possibility of introducing infection into the root is eliminated.—*F. A. Ormiston, Dental Science Journal of Australia.*

Avoidance of Gingiva Overlapping the Face of a Root

A good method of avoiding the use of a pin and temporary stopping between sittings in order to prevent the gingiva from overlapping the face of a root which has been prepared for a Davis or similar crown, is as follows: Mix up some zinc oxid and eugenol to the proper consistence (thick paste) and incorporate it in a pledget of medicated cotton. Then pack carefully in the root and over the face of the root. This will harden shortly afterwards. The substitution of the impregnated cotton for a pin eliminates the danger of the pin loosening and being swallowed.

—*Nathan Lesnie, Dental Record.*

Successful Inlays

Make an inlay which absolutely fits the cavity. Do not desiccate the dentin. Retard the setting of the cement. Mix a large quantity of cement. Just satisfy the chemical affinity. Do not trap air. Mallet inlay to place. Burnish margins into a locking embrace.

—*L. B. Morris, Dental Items of Interest.*

THE PSYCHOLOGICAL LAW OF ANESTHESIA

BY BERNARD FELDMAN, D.D.S., PATERSON, N. J.

(Written for THE DENTAL SUMMARY)

(While not necessarily endorsing any of the deductions of the author of this series, the Editor and publishers believe that, in the interest of the advancement of science, the work of all sincere investigators is deserving of consideration by the largest possible group of intelligent men and women. It is in this spirit that space is devoted to these articles by Dr. Feldman, even though they may be considered by some as rather remotely related to dentistry.—G. E. H.)

(Continued from page 358 APRIL DENTAL SUMMARY)

24

SLEEP

Sleep has long been regarded as one of the most baffling of the many knotty problems which science has been called upon to solve. Until lately, the conditions that determined its production have been but vaguely understood. Investigations carried on by Durham, Hammond, Mosso, Howell and others, alleged to prove that cerebral anemia, or the deficiency of the blood in the brain, is the great cause of sleep, really prove nothing more than that certain circulatory changes take place during sleep. Others attribute it to chemical and pathological changes which cause a poisoning of the system by toxic substances which accumulate in the blood. Recently, however, a decided advance has unquestionably been made by studying the laws of that youngest of the sciences, psychology. It is now known that sleep is no mere passive, negative state, the product of toxic and other harmful elements, but is an active, positive function, a protective instinct of gradual evolution and dependent for its operation partly on the will and partly on the environment.⁷

"To understand sleep," says Hugo Munsterberg, "we have to recognize it as one of the fundamental instincts comparable with the instincts for food (nutrition), or for sexual satisfaction (reproduction). Mental processes, subcortical processes and physical effects are involved in such a way that each reinforces the others. There must evidently be a subcortical center which controls the phenomenon, just as secretion and sexual hyperemia are controlled. This center probably lies in the medulla oblongata (*see foot-note No. 9*).

"The physical effects which enter into the production of sleep are: *First*, the fatigue sensation, which is probably the result of toxic processes, works on the lower sleep center just as appetizing impressions or sensual images work on the centers of the two other instincts; *second*, the organic sensation of *rest*, which associates

Foot note No. 9—"The medulla or lower brain is the seat, par excellence, of what are known as natural reflexes (or automatic) actions—actions performed wholly unconsciously, and not only without conscious will, but beyond the power of our wills to control. Such automatic reflexes concern the essential physical life of the body, such as the regulation of respiration, of circulation, and the beating of the heart, etc., etc."—Alfred T. Schofield, M. D., "*The Unconscious Mind*."

itself with this fatigue feeling. The complete "sleep circle" is formed by the fatigue sensation, the subcortical sleep center and the contraction of the vessels in the cortex to produce the rest sensation. As soon as sleep itself sets in, the circle is broken."⁹

We see that sleep is merely incidental to the operation of a universal psychological law which pertains alike to all the cells in the body. That law is, that under normal conditions, rest must always alternate with work in all vital processes and phenomena; otherwise speedy exhaustion and death necessarily follow. Even the pulsating heart apparently working without intermission, is in reality not doing so; as there are short intervals of relaxation between individual beats in which there is no expenditure of energy. The same is true of the other nerve centers, the continuous functioning of which is essential for life, such as respiration and the distribution of food.⁸ Even the nerve-cells enjoy comparatively long intervals of rest called refractory periods.¹³

Sleep is therefore a natural provision for rest, and is that physiological condition of the organism in which the nervous system of the individual is being recharged from without by the external, all-pervading cosmic energy, in precisely the same manner as an electric battery is recharged. The purpose of sleep is to recharge the human motor, to replenish in it the stock of energy which it had expended in the previous day's bodily and mental exertion—to restore it and fit it for the next day's work.²¹

Mental life is closely related to the activity of the brain cells, and we know that mental work is as much or more exhausting than is physical labor. (Mosso: "Fatigue.") All forms of bodily and mental activity, then, are dependent upon the same source for their renewal. Through what means and channel is this vital energy derived? The answer to this is certain and obvious; *through sleep*, and through sleep mainly is this renewal of the vital forces affected.²¹

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THE ELECTRO-NERVOUS FORCE OR VITAL PRINCIPLE

Scientists are supposing that the earth derives from the sun, not merely light and heat, but by a transformation of these, almost every form of energy manifest upon it; and that the energy of the growth of plants as well as the vital energy of animals are only the energy received from the sun, changed in its expression. Occultists claim that they know that this solar energy cannot come from this physical sun, because, just as man is informed

"Though the involuntary and voluntary powers of the mind are entirely distinct and seem to act independently of each other through two distinct sets of nerves, there must be some secret link between the two which unites them in one bond of everlasting and indissoluble union. It appears most reasonable that the mind holds its throne between the termination of the involuntary nerves of the cerebellum and the commencement of the voluntary nerves of the cerebrum, this seems to be the medulla oblongata. There the royal monarch sits enthroned."—(John Bovee Dods, "*Electrical Psychology*.")

The medulla is the main reservoir of the vital force or Solar Energy—(see Section 25).

by an invisible spiritual principle, in like manner is the manifested universe animated by an invisible or spiritual light, the sun behind the sun, and known as the *central spiritual sun*.

Whatever be its source, we know this much at least, that this solar force is unchanging in its mode of action and is playing unceasingly upon humanity. This life-giving principle interpenetrates all matter and causes different rates of vibration in its different densities to manifest to us the various states of consciousness. For all consciousness is matter played upon by this solar force; the higher the level of consciousness, the more subtle the matter, and the more refined the vibration. The evolution of consciousness is caused by the play of the life-giving force or Universal Mind in matter. There is a law which governs the action of this mysterious, ever-flowing stream or regenerating current directed upon matter. *This Force has the property of stimulating the atoms to assume new relationships and galvanizes the energy latent in dormant cells into a higher state of action.* While acting simultaneously in all spheres of being, yet it does not express itself in concrete form.

A supreme manifestation of this vital or solar energy upon the physical plane is found in the sympathetic and cerebro-spinal nervous systems of man. The solar force passes through the ganglia of the sympathetic system; there are *seven* principal ganglia (the mystical number once again—see section 14). Thence, it travels up the spine to the brain, where the currents unite. In its passage from one ganglion to another, its voltage is raised and is augmented by the power peculiar to each ganglion which it dominates. Besides these, there are nerve centers (or minor brains) in the cerebro-spinal system which are energized and vitalized.

This electro-nervous force is drawn by man from the surrounding atmosphere, mainly, as the air is inspired into the lungs. Sajous has convincingly shown that the ductless glands play a very important part in this vital process, and that it is not merely a chemical one. Filtering through the spleen, etc., and reaching the blood finally in a purified state, the arteries and capillaries transmit this electricity, or super-electricity, to the nerves which accompany the arterial system throughout. Why is it that nerves do not follow the venous system, and why is it that nerves do not contain blood? It is because the nerves get this electricity from the oxygenated blood of the arteries, and they store it up as *electro-nervous* force for the use of the mind.³⁰

Another minor source and channel by which the nerves get this electricity is through the food and water which enter into the stomach and stimulate the solar principle to produce new relationships of the atoms. We say they undergo vital changes in the digestive processes, not merely chemical ones; and it is the electricity that is inherent in them that is extracted from them with which we are more directly concerned here.

We can get along for months without solid food, and we can manage to subsist without water for a lesser period. But we cannot live without

fresh air, for this is Nature's major electrical storehouse. And we *must* have sleep to recharge the body with this electricity or cosmic energy, for if we forcibly deprive the organism of sleep, there ensues a great disturbance in the electrical equilibrium, manifesting itself in a great rise in temperature up to the danger point, upon the third or fourth day. If this torture is unremittingly continued, as was done in ancient days to punish criminals, death unfailingly follows upon the ninth or tenth day.³⁰ Sleep is therefore a vital necessity.

Just as the etheric double has been photographed while the subject has been rendered artificially asleep through mesmerization, so also has this form-aspect of man been invariably noticed by clairvoyants to hover near and above the profound sleeper. This is an absolute fact, which will soon be accepted by orthodox science, because it is an easy matter to obtain photographs. Even thought-forms have been photographed, showing that the vibrations in mental ether which we call "thoughts" are real, though superphysical and not supernormal, entities. So we can hopefully predict that the etheric double of the anesthetized patient will soon be photographed to satisfy all sceptics.

The various types of sleep are all analogous in this one respect, i. e., that the etheric double becomes separated from the physical body and lives consciously in the higher realms. The Ego-self never loses its individuality and works up and down the seven planes in Nature. Its electrical threads which comprise the vital-principle hold the various vehicles together.

Dreamless sleep is but one of the seven expanding states of consciousness in which the Ego-self can function. The unconsciousness of surgical anesthesia is but an analogous form of this state of consciousness, and the anesthetist should know this fact, because his drugs are sapping the patient's vital resistance. If pressed beyond the safety point, they will overcome the patient's powers, causing the electrical threads to snap, the two lower vehicles become forever separated, and the Ego undergoes the transition called death.

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ANALOGIES OF SLEEP PHENOMENA

If we study the subject closely, we can bring out many analogies between the normal or ordinary sleep, the mesmeric trance, and the unconsciousness of surgical anesthesia. We have been able to differentiate ten different stages of ordinary sleep, ranging from the abstraction of a deeply-interested reader in whom one or more of the senses are asleep, the mild rêverie or day dream, the slight slumber, up to the deep, profound state in which the Ego leaves the body completely.

An authority on the subject of mental suggestion records eight different stages of the mesmeric trance.¹⁰ There are similarly a great many varieties of chemically-induced narcosis, ranging from the mild exhilaration of the alcoholic, to the deeper narcosis of the cocain fiend or opium addict, to the profoundest depths of surgical unconsciousness caused by such drugs as

chloroform, ether, nitrous-oxid, etc. In mesmeric trance, we can have it ranging from a mild hypnosis, through intermediate stages known as somnambulism, etc., to the deepest state known as rigid catalepsy which resembles death so closely as to defy detection. Many poor victims have thus been buried alive; death takes place not until the soul has left the physical body never to return to it.

Furthermore, these various types of sleep may sometimes blend and take on characteristics that belong to an analogous form of sleep. For instance, ordinary sleep may sometimes take on some of the characteristics of the mesmeric trance, this condition being known as somnambulism. The alcoholic or cocain addict may evoke hallucinations and dreams that are analogous to the ordinary sleep or to the mesmeric. Rigid catalepsy may be changed into a quiet, restful slumber by an intelligent operator. And the anesthesia produced by mesmerism can be controlled so cleverly that it can be made to serve as well as the anesthesia produced by drugs for surgical purposes.

With hardly any exception, the writers on hypnotism agree that the natural, ordinary sleep is similar to the hypnotic trance. Gorgas¹¹ and Crile cite the similarity that exists between ordinary sleep and inhalation anesthesia. In this connection, Crile says:

"The outward similarity in the appearance of sleep and anesthesia needs no comment. The manner in which a child becomes unconscious under a sufficiently concentrated flow of nitrous oxid over its face, closely resembles the manner in which the normal child falls asleep. Another similarity is found in the resemblance between dreams during nitrous oxid anesthesia and the dreams of normal sleep."⁶

The more study we give to the subject, the more striking will many similarities appear between the various types of sleep, and we conclude that the *laws which govern the one kind will be found to govern them all*.

The whole matter rests upon the one important fact that all feeling or sensation is in the mind under the control of the Ego-Self, through the electro-nervous force that is contained in the voluntary and involuntary nerves of the body. These have become highly specialized for storing this psychic force, which in its totality constitutes the man's vitality or life-principle.

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THE PHILOSOPHY OF ANESTHESIA

Strictly speaking, the body itself has no feeling, for all feeling and sensation is in the Ego, which holds its residence in the medulla of the brain, and which as a living being of immortal form, has its spiritual hands, feet, brain, and other organs. Amputate the physical arm or leg, yet the fingers and toes as usual can be felt, for the Self has its spiritual arms, limbs, etc., corresponding to those of the body.

Indeed, the whole intricate physical organism is but a visible daguerro-

type picture of the invisible Self and from which it has drawn all its lineaments of form. They constitute the physical apartments of the earthly house which is fitted up as a temporary residence for the invisible inhabitant—the Self—during its continuance here.³⁰

But back of the form is—the *Life*. From worlds to atoms, the law is the same that there is nothing material in existence which does not appear at its opposite end, through seven gradations, in its spiritual counterpart, like two ends of the *same* stick. All space must be filled with something, for we cannot conceive of empty space; and this something is *atoms*, and back of these is the *Life*.

Life is everywhere—vibrant, pulsating *Life*. Even the “deadest” of so-called matter, i. e., minerals, are pulsating with it, and Sir Jagodis Chunder Bose, of Calcutta (who claims to have preceded Marconi in sending the first wireless message through this space), has devised a delicate instrument, the morograph (which is described in the *Literary Digest*, Oct. 16, 1920, Dec. 11, 1920), that objectifies the pulsations of life in *minerals*, beyond a question or a doubt. These pulsations can be seen, much the same as a moving picture, for they are thrown upon a screen.

What power arranges all the distinctive crystalline forms which are in existence? What life-giving principle fructifies the seed that blossoms into the rose, or the sturdy oak, or the vegetable? What differentiates the several kingdoms of nature, making man, who is the king of all, distinctively human? What invisible force carries out the wonderful changes and processes within man that make him a wonderful being with God-like attributes?

It is the life-principle or solar force, whose source lies in the emanations of the Deity, and which becomes stored up in the nerves for the Ego's use.

Let us cite one instance to make this principle clear. What constitutes the *vomiting* principle? Is it drugs or any other kind of stimulus? Such a drug or emetic cannot be the vomiting principle, because it is only an agent possessing peculiar chemical properties that cause vital reactions to take place in the form of immense secretions from the glands of the stomach, as long as there is *enough electro-nerve aura* in the system of the man to *produce the secretions*. An emetic will not vomit a dying man whose vital force is wasted, and it is powerless to vomit a dead man because the vital forces are practically gone. As a further proof, effectual vomiting can be obtained by a *mental* stimulus, as the mere mentioning of a fly's presence in a partaken beverage has produced it upon too many known occasions. So that, the vomiting principle does not lie in the physical or mental *stimuli*, but in the *electro-nervous fluid under the control of the Ego*.

Similarly, all vital processes such as nutrition, respiration, etc., do not depend primarily upon the food, or air, etc., which are but the stimuli which cause the Ego to bring into play the electro-nervous fluid and thus set into

motion the mysterious interchange of energies which are the building up of life.

Similarly, narcotics are not the anesthetizing principle, but are physical stimuli which disturb the normal equilibrium of the nerve-cells with the peculiar power of bringing on the subconscious state of mind and the induction of sleep in one of its numerous forms. The Ego is forced to restore this equilibrium, by stirring the electro-nervous force or the super-electricity which is latent in the nervous system and transmits the subtle fluid by means of the hormones, which are practically the capillaries, to finally reach the dendrites of the nerve-cells to cause their complete isolation.

The Ego remains at all times the master of the two intimately connected nervous systems in man, and employs the super-electricity that lies latent in them to carry out all processes which assure the safety and the preservation of the organism (*see foot-note No. 10*).

This electro-nervous force, or fluid, or aura, is the connecting link between the Ego and the physical organs, and in this way, *only*, does mind control and govern every cell in the body, if the connection is not broken by palsy, paralysis, etc. The mind stirs the spiritual fingers, etc., through the electrical action of the nerves, which are laid like so many telegraph wires between the two. It can be made to act in one or both of two ways: (1) by physical impressions or stimuli, and (2) by mental impressions. Under Section 22 we have listed four physical and five mental types of stimuli that can be employed *to induce sleep* in one of its many forms. We cannot discuss them all, so we will choose one from each of the two groups that have the greatest bearing on our subject.

However these sleep-inducing stimuli may differ in their natures at the start, they are all transformed by the wonderful processes of transmutation of energies within the human system, eventually to cause the inherent electrical equilibrium to be disturbed. These vibrations or impacts are communicated to the brain by means of the mechanism of consciousness described under Section 19, and which may also involve the subcortical sleep center in the medulla, as some scientists are supposing.

The Ego-self is at all times master of the situation. He responds to the instinctive call for the preservation of the organism, and stirs the electro-

Foot note No. 10—As a final clincher to the argument, J. G. Bose proved that fatigue and narcotics affected vegetables in varying degrees, the carrot's pulsations differing from the cauliflower's. The narcotics slowed down the pulsations markedly: *he showed that even a crystal could be affected by narcotics and fatigue*. What better proof that it is the Life-energy that is universal in nature which is the main principle involved in anesthesia as well as all other vital processes. We defy Jacques Loeb and all others who have the "mechanistic theory of life" to restore this life-principle to the decomposing, "dead" body. Dean Kimball, of Cornell, may prepare "synthetic food" in his laboratory; but we defy him to give to it the vitamins which contain this electro-nervous principle. As Arthur Brisbane says: "There is another power which has something to say about all these improvements."

While greedy manufacturers are selling vitamins (?) to a gullible public, scientists are becoming convinced that they cannot isolate them after trying their hardest to do so.

nervous fluid or aura contained in the subconscious nervous system, to reach the dendrites and causes them to retract. This vital reaction causes the complete isolation or segregation of the brain-cells, and the brain can no longer receive outside sensations until the stimulus is removed.

If the vital forces are too much weakened by accident, by disease, or by an overdose of the stimulus, the Ego-self becomes powerless to keep the physical and psychical parts together. The electrical threads which hold them together become severed slowly, and the Self undergoes the transition called death, leaving the physical body to disintegrate into its simpler elements.

28

ANESTHESIA BY MESMERISM

There is one important characteristic of the mesmeric power which has been confirmed so repeatedly that we can doubt its truth no longer. This is the phenomenon of anesthesia which can be produced in many cases in such a wonderfully-balanced manner that it warrants, nay, commands, the more general attention of the medical and dental professions. It is true that ever since its discovery, the scientific bodies have ridiculed and scoffed at it; but we are today sufficiently imbued with the motive of rendering the best service to suffering humanity to abandon this unreasonable attitude, and train our spiritual selves properly to be able to employ this great and wonderful agency which Nature in her goodness has furnished us. The truth is no longer even questioned by *those who know*; yet there are many who condemn it before trying to find out the truth by just a little study of the subject.

True to the law of psychology, *suggestion does play a very important part in this phenomenon*. The potency and depth of the anesthesia that can be induced by mesmerism seems to be under the perfect control and will-power of the mesmerist's suggestion. If he "suggests" local anesthesia, to any parts of the body, this suggestion becomes a command, and the phenomenon takes place. Just how, we do not know; but it works and has worked and will work when intelligently performed. If the suggestion is for a general or profound anesthesia for surgical purposes, this profound stage is obtained satisfactorily. The only condition that may be considered as essential, is that the patient must have been mesmerized once or twice beforehand to obtain the best result.

The effectiveness of "suggestion," even upon the waking consciousness, is a well-established fact; and as the objective senses are slowly but surely becoming controlled by the subjective mind, this power becomes stronger and stronger. The power of suggestion is strongest when the inner man, through his organs called the subconscious mind, is in complete control. The hypnotist is thus enabled to exert upon his subject an occult influence which is more powerful, more subtle and more unknown than any known drug, because the subject surrenders to him his body *and mind, too*.

It is obvious that such powers must be rigidly safeguarded so as to be

used unselfishly to the uplifting of humanity. In the hands of one, such as a Treader of the Path, whose character is above reproach, and who has been thoroughly tried and proved worthy, whose *motives* are unquestionably of the purest and highest, in such hands mesmerism must prove a blessing. Such an occult student is told of the dangers involved, and can thereby protect himself and his subject. But, in the hands of an unscrupulous and a selfish person, it may be turned into the worst curse. The character of the operator should therefore be known; the patient should be as careful in this choice as he is with the choice of the surgeon or anesthetist in whose hands he is entrusting his very life. *The safest suggestion is to forbid anyone's inducing anesthesia through the psychical channel* (which constitutes an intrusion upon the subject's spiritual individuality which is an unforgivable crime), unless *the patient's life is in danger* through a badly weakened or badly mangled body. In such a bad-risk case, in which a surgical operation is necessary and the administration of narcotics is decided upon for anesthesia, then and only then should the psychic agency be called upon as a measure of last resort to minimize the dangers attending the possible fatal outcome.

The great value of the method when used judiciously lies in its causing the minimum amount of trauma to the body and its cells. But this topic can be best discussed in our next and final installment, in which we will discuss the chemical induction process.

A very interesting account of a surgical operation on a bad-risk case in which anesthesia was obtained by Dr. Cocke's using hypnotism, can be read in his book,⁴ pages 97-98. (See foot-note No. 11.)

Foot-note No. 11—Dr. James R. Cocke's description of his case:

"The patient now to be described was a young man, suffering with tubercular disease of the bladder. His sufferings had been for over a year something terrible to witness. Opiates had been used, practically in vain, as he soon established a tolerance for each and all of them, and could take astonishingly large amounts of them without either stupefying him, or in the least mitigating his misery. The terrible suffering so wore upon him that his whole nervous system was shattered.

"It was necessary, of course, to treat the bladder locally. Under hypnosis this could be accomplished without pain. Finally an exploration of the bladder became necessary, with a view of removing inflammatory material. As there had been other surgical procedures in the case, the patient was so worn out by these various attempts to relieve him, that we feared the sight of a strange surgeon might prove too much of a shock to his enfeebled nervous system.

"At my request an eminent Boston surgeon was called and arrangements made to administer an anesthetic. The man's condition was so feeble that we feared that chloroform, ether, or gas would prematurely end his life. I stated to the surgeon that I believed he could be hypnotized to such an extent that he would never know what had occurred.

"Now, as every tissue about the bladder was, owing to its diseased state, as sensitive, possibly, as the human eye, every one familiar with bladder surgery will realize the depth of anesthesia that must have been induced to obtain the following results.

"The patient was thrown by suggestion, and by looking at a bright object, into a deep hypnotic trance. Let me say, in passing, that his temperature was 103.8 at this time.

"After he had been thoroughly entranced a pre-arranged signal was given, and the surgeon entered the room. He explored the bladder thoroughly through a suprapubic opening, investigated every part of it, and determined its size, and this by means of touch. Proper apparatus were adjusted for drainage, and the wound dressed.

The surgeon left the room, declaring that the degree of anesthesia obtained seemed to him 'absolutely uncanny.'

"Hypnotism was used on this young man twice or three times a day for a period of nearly four months, and the amount of pain saved is a little short of miraculous."

References:

- 4J. R. Cocke, M. D., "Hypnotism."
- 6W. G. Crile, M. D., DENTAL SUMMARY, June, 1917.
- 8T. J. Hudson, "The Law of Mental Medicine."
- 9Hugo Munsterburg, "Psychotherapy."
- 10J. Ochorowicz, "Mental Suggestion."
- 13Howell's Text Book of Physiology.
- 21Hereward Carrington, "The Coming Science"; "Vitality, Fasting and Nutrition"; "Your Psychic Powers."
- 30Dr. J. D. Dods, "Electrical Psychology."

(To be concluded.)

Annealing Clasp Gold

The spring or resiliency of the clasp is often lost when the clasp is cleaned, and when the tail or lug is soldered to it. Metal such as used for cast clasps, and having a high platinum content, is annealed by heating to a cherry red and then quickly immersing in a fifteen per cent solution of sulphuric acid. Even sudden chilling in water will anneal it. On the other hand, it is hardened by bringing to a cherry red and then allowed to cool very slowly. So when cleaning a clasp place it in boiling acid. And after soldering to it don't throw it in acid or water, but let it cool slowly.

—I. T. Dresch, *Dental Digest*.

Use of Cavity Lining

Many supposedly good synthetic fillings have in reality proven unsuccessful because of a certain point that is frequently overlooked. No matter how square your margins may be prior to placing the synthetic material, if care is not exercised in the application of the cavity lining the filling will become "leaky" in a very short time. The varnish should be applied only over the pulp chamber and not placed indiscriminately all over the cavity, for if the varnish covers the margin, it can readily be seen that after placing the filling material in the cavity, a thin layer of varnish exists between it and the square margin. Very shortly afterward, the varnish is washed out, leaving a space.—Nathan Lesnie, *Dental Cosmos*.

Vulcanite Dentures

It sometimes happens that a little piece of red rubber comes through the pink on the labial part of the gum, and so spoils the appearance of the case. Bur this out, leaving the edges defined and slightly undercut. Have the cavity a definite shape, round or square. Next get a piece of old pink gum which has been vulcanized, and cut it to the size of the hole, or very slightly larger. Hold this on a spatula over the bunsen burner (do not burn it), and, while warm, force it into the cavity. Hold firmly till it is cold, then smooth off and polish.

—Gordon C. Barkley, *Dental Science Journal of Australia*.

PENETOLOGY

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This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

The value of penetographic portrayals does not always lie in that it gives a correct portrayal of the aspect of a part nor in that it details the outline of a part. It may be more correctly stated that it outlines the detail of parts. The correctness with which detail of structure can be pictured and the extent to which certain outlines exist comprises the worth of penetology.

The structure of bone is therefore an important matter for consideration. Not alone the structure of bone as a mass, but the structure which is intimate in its relation to such a mass, particularly under the surface.

In previous papers of this series shadows were explained as being the representation of the penetrating force which the X-rays or peneto-rays possess. The relation of this force and its effect as represented in shadow was graded and explained as an index or coefficient of atomic density. The application of these ideas as presented and related to the dental areas will be attempted in this paper.

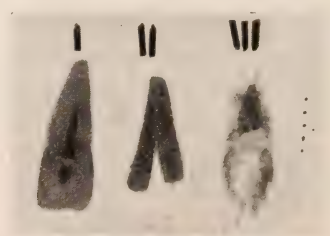


Fig. 1—Penetographic portrayal of teeth, whole tooth indicated by one metal marker, ash residue indicated by two metal markers, and animal residue after acid bath indicated by three metal markers.

The three grades of shadow or rather the index or coefficient of resistance which is represented by shadows as outlined, is well pictured in the illustration. (It will be noted that the positive reproduction is used. Dark in color, therefore, meaning less in penetration.) The several subjects used in this illustration indicate the several elements which enter into the composition of a dental penetogram. The dark numerals are (metal) portions of the shaft of a pin and are placed above the various subjects. The num-

ber I is over a whole tooth as it appeared after extraction, the number II is over a tooth which was burned in the flame from a torch and represents the ash residue, and number III is over a tooth which was decalcified, having remained in an acid bath for 24 hours.

The differences here pictured are particularly noteworthy. They represent a resistance to roentgen-ray or X-ray penetration of masses purely of metal, which have a high atomic density (note DENTAL SUMMARY for February and March), and is classed as grade III shadow, the resistance of mass with mineral salts as tooth substance (I) and tooth structure with the animal matter burned out (II). Both these appear as shadow of grade II, and lastly the resistance of animal matter without mineral salts (III) which will be noted as grade I shadow. Within the latter tooth (III) can be seen some denser substance and its appearance is typical and it can be quickly located because of the increased resistance its presence offers.

The closer study of these figures proves that density as expressed by the density of the atom can be pictured and differentiated as can density of mass in a variation of compactness of structure. The latter differentiation is, however, better pictured in a difference to be noted in similar masses of alveolar bone and dense bone or tooth.

Our knowledge of the application of the X-ray and the perfection of our portrayal of living human tissues and our ability to interpret the resultant picture is limited. A technic may be developed by which the structures which we do portray will show even finer structural formation than those to be noted in the alveolar tissue as the lacunae or Haversian canals or the pulp chamber and root canals of teeth, and our ability to interpret such pictures might develop with our technic. This branch of science may follow the present trend of advancement to the extent of even picturing and interpreting minute changes or changes of molecular character.

The interpretation of the finer features of an X-ray picture, that is the understanding of the meaning of the fine lines seen, and the appreciation of the difference in meaning represented in a difference in shadow is what governs the value of a diagnosis. The other essential is to determine the location of the area pictured and to locate within the area the position of the component parts.

As with photography and in painting, foreground and background are indicated by a distinctness in detail, so in penetography a variation in distinctness of shadow or of the outline of the objects within the field is indicative of its position as either in the foreground or the background of the field pictured. Because of the placing of the film for dental penetography, within the mouth, foreground and background to be noted is in relation to the bucco-lingual or labio-lingual diameter. The foreground on an intra-oral penetogram, therefore, is that portion which is to the lingual aspect. What is between the buccal plate and the lingual surface of bone in either jaw is of interest in penetography of the jaws.

The picture delineated in lines and shadow surfaces is a representation

of what might be seen in the jaws if the lingual tissues and the lingual surface of the bone were removed and one were looking from the inside of the mouth outwardly. The lines are the points of demarcation where an area of a given density terminates and another area of a distinctly greater or lesser atomic density or of vitally different structural formation or distinctly different position begins.

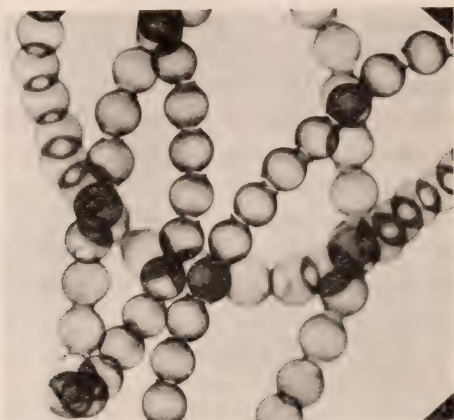


Fig. 2—Penetographic picture of beads at a varying distance from the film. (See text.)

The illustration of the difference in appearance of similarly dense masses due entirely to position as in the relative foreground or background is well pictured in the penetographic representation of hollow wax beads which were wrapped around a mass of cotton to effect their necessary separation and to place some at a distance from the film. In the above illustration it will be noted that some of the beads pictured are sharp in outline and smaller in shape than others which are less sharp in outline and larger in size. Disregarding the appearance as presenting a registration of penetration, and viewing the illustration as a drawing of a chain of beads, one differentiates at once those in the foreground and those in the background. This is done by the clearness of detail represented in each. Now then, the same is true in penetology, the only difference being that the light or rather force which causes the impression on a penetogram is derived from the background and is direct in character in contra-distinction to the light of photography and paintings which are seen only because of light derived from in front of the object and are pictured because of reflected light.

The beads which are all equal in size are not all pictured of equal size. Those seen as smaller outlines in reality are more nearly the true size of the beads. They are those which are nearer to the film. These areas are sharply outlined and show a distinct variation in depth of shadow. This depth of shadow is governed by the mass of spherical shape which is being penetrated. (This will be illustrated subsequently.) Particular attention is called to the fact that the centers of these spherical masses are not as deep

in shadow and do not represent as much resistance to penetration as does the shadow outlining the extent of the hollow wax beads. In fact the deepest shadow is just within the outline and not the line describing the extent of the bead. The beads at a distance do not show any of these details. The reason for all of these variations can be explained through the fundamentals of physics and the mathematics of force or wave propulsion. Attention is directed to several areas where the bead shadow is overlapped by that of a more distant bead or its neighbor and how distinctly the difference in penetration of light can be noted and how clearly the outline of each bead can be distinguished. In the lower left hand corner where the string of beads looped, four beads are pictured together, yet it can be distinctly seen which portion of the shadow represents the nearest bead, or that in the foreground, and which represents the farthest bead, or that in the background. In the group of four shadows or beads the one farthest to the right and above is the one in the foreground, while the one to the left and on about the same level with it is in the background or farthest away of the four. The difference between foreground and background is again distinguishable in the upper right portion of the picture where two of the parts of the strings of beads cross one another. Note particularly the difference in size and clearness of the shadow as well as detail. In the middle right portion of the picture note the difference of the effect of the overlapping of several beads in a position about midway between foreground and background.

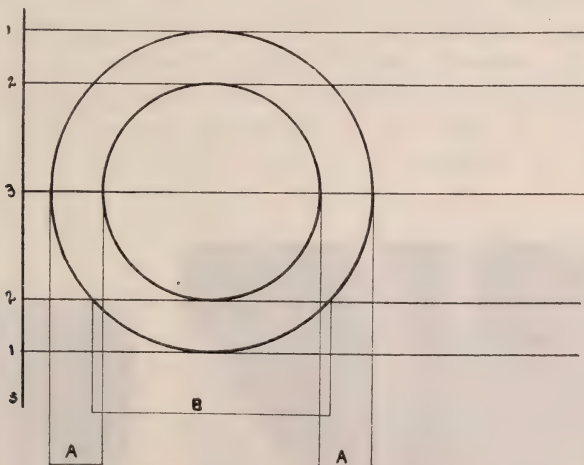


Fig. 3—Horizontal lines marked 1 indicate the periphery of a spherical object. Lines marked 2 and 2 pass through a tangent to the inner surface of the spherical wall. Line 3 is through the diameter. The mass density of the wall is equal, still from the chart it will be seen that mass through the diameter (Line 3), A and A is not as great in extent as is the mass on the line 2 which extent is shown as B.

Reviewing the chart pictured above, it will be noted that the greatest thickness of mass in a hollow sphere such as a wax bead, is not through the center, but along a line at a tangent to the innermost surface of the spherical

wall. Note particularly the mass thickness represented at A and A and note that their combined length of mass to be penetrated through the diameter, is not as great as that of the line B, which represents the length of mass to be penetrated at a tangent.

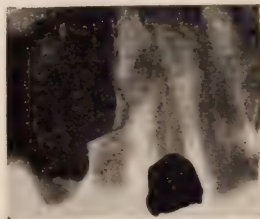
Applying the appearance represented by this string of beads to bone, and particularly to alveolar bone, which is composed of numbers of spaces surrounded by a wall of bony substances much as each bead is surrounded by a wall of wax. These spaces are the lacunae or Haversian canals described in bone. Masses of greater density than is represented by alveolar bone mass are pictured in such areas. They may be tooth substance, minerals or metals. Their relative position, that is in the foreground or the background as represented in a picture, is determined by the clearness of detail of the lines which mark the extent of these masses or the relative depth of the shadow of the grade they represent.

Learn to read the penetogram and to read it well. It is the most unfailing aid in the diagnosis of the condition of bone, normal or pathological, the tooth, if vital or non-vital, the filling, if well fitting or not, and in fact many conditions which would be incapable of diagnosis without its aid.

AN UNEXPECTED FINDING.

The adage "Seek and Ye Shall Find" may well be applied as the reason for the discovery of cause for the non-eruption of the cuspid (canine) tooth in this patient's upper left jaw.

The patient is 33 years old and she makes the statement that there was never any tooth removed from this area. This was verified on examination by the finding of the deciduous cuspid still in position. The patient gave no history of pain nor discomfort in this area nor of any reflex symptoms of any character. The X-ray examination pictured a surprising condition.



Instead of the common type of impaction of mesio-distal character so often seen and in this case expected, the cuspid is found in an almost normal position for eruption, but blocked in its path by a supernumerary lateral which presents a disto-mesial impaction and against which the crown

of the cuspid (canine) is impacted.

This patient refused operative interference and therefore the findings so well pictured in the penetogram have not been confirmed, although there is no doubting the condition to be as is so clearly pictured.

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PENITOIZED PARAGRAPHS

Competency is the weapon of competition. Many ways have been and are being suggested to rectify the X-ray laboratory evil. There is much food for thought in the situation so often designated as the "X-ray Shooting Gallery." An analysis of the situation proves that in this branch of science the law of supply and demand is operative as it is in other branches of world industries. And X-ray picture taking is a world industry. The demand for the dental penetogram is growing. The time is approaching when no diagnosis of any condition is complete without the determination of what the mouth discloses. The dental practitioner to be considered abreast of the times will have to have easy access to the X-ray machine and the making of the penetogram. That is the most simple part of the entire situation. Because it is the easiest, it is that phase of the situation which is the quickest to be developed. And in the developing of anything in any field—in business or science—the good must rise from the ashes of a varied beginning like the "Phoenix." Today the reason for the existence of the X-ray laboratory and the rapid fire method of picture making lies as much in the feeling on the part of the public and the fact as it exists in the profession, that when it comes to an X-ray picture any one guess is as good as any other.

It is a pity that a profession as old as the healing art and as organized as it is, cannot cope with a situation more competently than it has that of the present day X-ray laboratory. There is no business in which a new development is not watched and into which and out of which the masters of that business have not put into nor taken from the best that they can give. They send their trained men into conference and develop a new idea to its fullest extent. They learn all about the possibilities and how to utilize every bit of energy and all the power the force they are studying may develop. Interest is at once created and to make the idea a financial success it is tested extensively before being given or disposed of to the public. Not so with the dental penetogram. The X-ray machine operators produce many bad pictures—but what of it—the public foots the bill and in the meantime—sometime in the future—the professional man will learn to explain what the pictures show. The public is quick to learn that but few there are who can read a dental penetogram, so to them it makes no difference who takes them. What difference there is, is registered by a difference in dollars and cents to them. They will not willingly pay a

higher price for any commodity which they can get for less. The X-ray laboratory does the same work for less.

Doing the work for less money is not a losing game for the laboratory because it is a business institution and as such it is conducted along approved business lines. Business dealings establish a set price for a definite piece of work. The price permits of a profit. It is the volume of work which governs the amount of the profit. The X-ray laboratory has created a new situation in the profession and one with which it will be difficult to deal. The longer it is allowed to continue the more difficult it will be to overcome. Should they be overcome is another question. The great number of pictures which a laboratory must and does turn out to prove profitable, aside from turning a profit to the owner, creates a feeling of confidence on the part of the patient—often the victim—in the ability of the operator to diagnose the pathological condition a picture may show. The patient's confidence comes from the feeling that because of the number of pictures taken a better understanding of the picture is developed at a laboratory than by him who is at a disadvantage in taking but a few pictures for his own patients. The deductions of the public mind are often correct and likewise often wrong. In this instance most often wrong. The X-ray laboratory in the hands of a lay operator, not under the supervision of a trained anatomist and pathologist, is a menace if it offers a diagnosis. The confidence the public displays in the ability of such a lay person, to diagnose dental and medical conditions, is misplaced and only governed by the vote of the masses. True, experience teaches many things, but experience of this nature only teaches how to take good pictures, not to diagnose them.

Unusual findings as supernumerary teeth, impacted teeth, unerupted teeth and the pictured position of bony canals and foramina of unusual type are beginning to find their way into dental literature and are now claiming much attention. Anatomically or histologically and pathologically these variations have not been mentioned so often in the past. The increasing numbers of these findings and their recording in increasing numbers leads to the question of their value. Their meaning as a representation of an alteration in mouth changes that is taking place or the accidental discovery of their presence because of a better means of finding them is worthy of consideration. How often these changes might be looked for in what number of cases would be an interesting thing to know. It would be a valuable matter for consideration. It would be a means of checking up if the mouth and teeth are deteriorating or undergoing any changes which will be manifested or completed in future generations. An interesting contemplation. A valuable bit of information to have.

In the *Dental Cosmos* for February Dr. Hinman remarks that X-ray

pictures are unnecessary to one whose sense of touch is trained, and that by the touch method apical infection can be discovered before any pictures are made. In these statements we will have to take issue with Dr. Hinman. Primarily because we are not all as adept and capable of such acute and correct palpation, and secondarily because of the two methods of examination it is deemed that the penetogram is the simpler and easier and therefore the more accurate. In defense of his assertions, Dr. Hinman makes the statement that: "the X-ray does not show infection but may show the results of infection, that is, bone destruction." We contend that if bone destruction does exist, and it always does with infection, that the X-ray picture or penetogram will disclose it long before it can be palpated and long before the process can extend to a sufficient size to become palpable. The error is not in the visibility of the process but in its determination and the determination of its character.

Research should be the foundation of any statement made of any character bearing on the health of any person or the determination of the pathological character of any finding relating to human tissue. Sadly, this is not always done. As indicative of an error of omission one needs but to look to the present wave of condemnation of teeth and their wholesale slaughter because of the appearance in the X-ray picture, the penetogram, of the condemning "black spot at the apex." No need to comment on how many teeth have already been sacrificed because of this finding and we shudder to think of how many more will be sacrificed at the altar of ignorance before some authoritative and necessary penetographic research will be done on a large scale and the teaching of this valuable asset in medicine and dentistry, the correct reading of the dental penetogram, will be more generally and thoroughly understood. Medicine and dentistry must work out this situation on a broad minded basis. A far-reaching research is necessary to determine which types of conditions are associated with various diseases or why they are present in the apparently healthy state. The cause for the change from a state of apparent health to that of disease associated with various conditions must be determined.

Dissection has been the derivation of all our authority on anatomy, histology and embryology in the past. Research therefore was limited. Limited by such cases as did come to dissection. The X-ray, by means of the penetogram places these studies into the discard, so to speak, for whereas the statistics of old were of necessity confined to a limited number of cases to determine an average, the average of today can be made from an unlimited number of cases, not observed after death when growth stops and any tendency that natural developmental changes may have to correct any abnormality, but pictured from the beginning of the earthly life of the subject and watched through the developmental period and all stages during life and not after death. The possibility of a newer idea of dental

embryology is great, particularly if that embryology be based on X-ray findings from early infancy or even the study of fetal bone pictures to the time of a completely developed dental arch of teeth of the second denture.

Dr. McGee in the *Oral Hygiene* of February, speaks of itinerant teachers and the need of their regulation, A praiseworthy editorial, food for deep thought, a situation which calls for action. The question of vital importance, however, is how their regulation is to be carried out. The subjects covered by the itinerant teachers cover every branch of the subject of dentistry, medicine, chemistry, bridge building, crown making, porcelain baking and blacksmithing as well as surgery. Yes, we have left out a few, bookkeeping, diet, X-ray and countless others.

Every new development has its enthusiasts. The enthusiast becomes a teacher. More often he becomes a salesman, and there is the rub. When the importance of the medical benefit or the benefit to the human race in a medical—and by medical is meant healing—capacity is only estimated by the numbers of the sales which can be made, that itinerant becomes a sales person and not a teacher. His interests are centered in his sales. Such a teacher cannot be condemned in too severe terms. Too bad that there is no absolute way to bar him. The itinerant teacher—that is the one who sells true medical knowledge—is a necessity. He cannot be regulated by laws and state board examinations as Dr. McGee suggests, for very often his subject is foreign or new to such boards still vital to the general practitioner of the healing art who cannot give weeks of time to attend a post-graduate course. In the early days news and teaching came by way of "The Wanderer." Teaching by way of the itinerant teacher. When education was standardized and a stranger brought news of a new discovery he was ridiculed. Even though 1500 years ago the medical man of Thibet took the pulse of his patient, in 1628 when Harvey announced his version of the circulation of blood and the action of the heart, he was greatly discredited. Many of the greater advances in medicine have suffered a similar period of discouragement—because they do not all come from a recognized standard of teaching. Many have come from the Wanderer—the Itinerant Teacher. No, the recognized state board examiners are incapable of examining in subjects they are ignorant of. The solution of this question does not lie in that direction. It requires more and deeper thought.

Taking a Bite for Crown and Bridge Work

In some mouths where crowns or bridges are to be made the opposing teeth come into such close contact that the wax or compound is bitten clear through in taking the bite. In such cases, place a layer of wax or compound on each side of a piece of cheese cloth and then take the bite. Try it.—C. N. Reese, *Dental Digest*.

CORRESPONDENCE

THE USE OF GAS-OXYGEN

BY M. J. CRAMER, D.D.S., CLEVELAND, OHIO.

Under the heading of "Suggestions" in the March issue of THE DENTAL SUMMARY was printed "Practical Hints for Oxygen Gas Extractions" which were apparently written without a grounding of sufficient knowledge in the use of gas-oxygen to be of any practical value, and since there is need for a more general and a more thorough understanding of the use of gas-oxygen, I am taking this liberty of attempting to correct the mis-statements made in the "Hints" referred to.

This article is so misleading that it is an injustice to the many well trained and expert anesthetists and extraction specialists throughout the country. There is so much good literature to be obtained on this subject and from such bodies as The National Anesthesia Research Society, The Interstate Association of Anesthetists, that articles of this type have no place in scientific or professional literature.

The size of the patient has nothing to do with the use of gas-oxygen for extractions. Any patient, regardless even of habits including alcoholism, morphinism, may be successfully anesthetized for any surgical operation including the extraction of teeth. The fact that Dr. Cox referred to the bag being drained is evidence in itself that the apparatus which he employs is not constructed to meet the modern requirements of prolonged anesthesia necessitated by the later methods of extraction and alveolotomy with plastic restoration of the gum. His difficulty is a mechanical one which calls for a better apparatus.

Dr. Cox says that one of the chief reasons for loss of confidence on the part of the patient is caused by the patient slipping down in the chair while under gas. Just how anyone could instill confidence in an unconscious patient slipping down in the chair is more than I can fathom. This seems about on par with another statement Dr. Cox makes when he says it is dangerous to use the nasal inhaler because the patient might be given too much gas. Surely one can give more gas by covering the nose and mouth such as is done with the face inhaler, than by just the nasal inhaler alone.

In another paragraph it would seem that the position of the head would be all that would be necessary to prevent the inhalation of fillings, fragments of teeth or blood. I believe it is a general practice by those most experienced in the extraction operation to thoroughly pack the mouth with gauze of sufficient size that it may not itself be drawn into the pharynx, and that it will positively prevent the aspiration of fragments, fillings and also

absorb any blood which may have a tendency to run into the throat. This leaves the operator free to place the patient in such a position as to facilitate his work without the dangers above referred to. A gauze pack eight inches long and fifteen inches wide and folded so as to be three inches wide and eight inches long, forms a pack of sufficient size that two or even three such packs may be placed in the mouth with the tips of each pack extending out of the corner of the mouth opposite the work. The pack serves also another purpose, namely, it relieves the necessity of administering the gases under excessive pressure to prevent the inhalation of air through the open mouth and thus avoids much of the waste of gases which necessarily occurs in prolonged operations where the mouth is not properly packed.

The face inhaler has practically no place in the extraction operation except that it may be used for the inflation of the lungs with oxygen should a patient stop breathing. Prevention of aspiration of fillings and parts of teeth is of the first importance, but should a filling be inspired the patient should be administered pure oxygen at once and the chair tilted back until the head is much lower than the feet. The oxygen restores the cough reflex, and with the patient in this position she has the best of chances by the use of gravity and coughing to dislodge the foreign body from the lungs and air passages.

Speed in the extraction operation is a remnant of the old days. With the best gas-oxygen equipment and a proper training, we are now able to maintain anesthesia with gas-oxygen for any length of time and on any patient.

309 Commonwealth Bldg.

INFORMATION WANTED

Editor DENTAL SUMMARY:

I would like to have as many of your readers as possible answer the following questions and send their replies to me.

- I. How many cases supplying the teeth posterior to the lower first or second bicuspid did you make last year?
- II. What kind of attachments do you use? (Give number of each.)
- III. What kind of lingual bars do you use?
- IV. How do you get your impressions?
- V. How do you take the bite or register central occlusion?
- VI. What do you use for casts or models?
- VII. What percentage of your cases do you rebase?
- VIII. What is your favorite alloy for castings?

We want to include the answers in a report to be given before the Partial Denture Section of the National Dental Association meeting next July. No names will be used. If you can supply specimen cases that were either successes or failures they will be photographed or shown in the clinic.

It is hoped that some aid may be derived from these compilations in the construction of these cases, which will be to our mutual advantage.

Thanking you in advance, I am

Fraternally yours,

EDWARD H. BRUENING.

First Nat. Bank Bldg., Omaha, Neb.

FINE OPENING FOR A GOOD DENTIST

Barranquilla, Colombia, S. A., March 24, 1922.

THE RANSOM & RANDOLPH Co.,

Toledo, Ohio.

Gentlemen:

We are taking the liberty to inform you that here in Barranquilla there is an open field for a person to establish a fine dental practice. Barranquilla has a population of 80,000 inhabitants, and there are very few dentists. A modern dental office here with an expert dentist can do a brilliant business. Of course the dentist must know a little Spanish for better success. We are in close touch with the trade here and have observed that the field is entirely open, and we sincerely hope that you could be able to interest a good dentist to establish himself here. Dental work costs just as much here as it does in the United States, and the clients here are so numerous with these few dentists that it is impossible to take care of them satisfactorily. We know a number of cases that the patients are going to another city to have their teeth looked after. We shall be very glad to give you any further data you desire, or send it direct to the interested party. We have no interest in the matter whatsoever, but simply we want a good dental expert in this city.

Yours, etc.,

CORREA & BLANCO.

LOOK OUT FOR THIS FRAUD

An Eastern manufacturer of dental supplies has written the Gwinner-Mercere Company, Memphis, Tenn., that a man called at their place of business representing himself as Mr. E. L. Mercere, and claiming that he had taken an automobile tour from Memphis to the East and had met with a serious accident to his machine and wished to obtain a small loan of money.

The man is an impostor, as Mr. Mercere is, at the present time, in Memphis, Tennessee.

This man is apparently familiar with the dental supply trade and may represent himself to be somebody else in attempting to obtain money from others.

AMERICAN DENTAL TRADE ASSOCIATION CREDIT BULLETIN.

OBITUARY

DR. WILLIAM VAN BERGEN AMES

DR. AMES died at his winter home in Arizona, February 23rd, 1922. He was born at Attica, Ohio, May 27th, 1859.

His father was an eminent physician and the family later moved to Fremont, Ohio, where the son attended public school until he entered Notre Dame at South Bend, Indiana. He entered Ohio Dental College at about twenty years of age, graduating in the spring of 1880. During his college course he won a number of medals offered by the faculty for the best work in the different branches taught. He won gold medals for prosthetic work and for superior work in chemistry.

Dr. Ames located in Chicago, Illinois, in 1881 and soon came into prominence as a dentist of special ability, making improvements in denture construction and prosthetic appliances in general. He was one of the original inventors of the gold inlay. With four others he organized the Northwestern University Dental School in 1891 and was for several years Professor of Prosthetic Dentistry in that institution.

Aside from his original work in dentistry he devoted much time to originating dental cements, but did not push this investigation until it became evident that his eyes were failing for close dental work. When satisfied that he had originated an excellent cement that would be of real value to the profession and the public, he placed the outcome of his original chemical work on the market. And Ames cement is now known throughout the world.

In 1895 Dr. Ames married Miss Virginia Gilmer, daughter of Dr. T. L. Gilmer, Chicago, and the married life was a happy one. In 1913 he bought a farm of eighty acres near Lake Forest, Ill., and in the summer of 1914 had his first taste of living in the country. From time to time he added to the original tract and at the time he died the farm had increased to eight hundred acres. The war and the plea to farmers to farm for our Allies and for the United States caused him to farm to the limit of his land. Farming under war conditions was a difficult task for any tried farmer and contending with the many problems which arose seriously impaired Dr. Ames' health, and he loaned one hundred and ninety acres to the Women's Land Army of America and this tract was cultivated for war purposes by farmerettes.

For the past several years Dr. Ames has spent his winters in Arizona. In 1921 he built a large home in the desert near Chandler and it was here that he passed away.

Dr. Ames was a member of the National Dental Association, Illinois State, Chicago Dental Society and Odontological Society of Chicago. He was a genial man, beloved by all who knew him, and he will be missed by the dental profession.

SOCIETY ANNOUNCEMENTS

Pennsylvania State Board

The Pennsylvania Board of Dental Examiners will hold an examination for applicants for a license to practice dentistry, in Pittsburgh and Philadelphia on Wednesday, Thursday, Friday and Saturday, June 21, 22, 23 and 24.

The theoretical examinations will begin on Wednesday, June 21, and will be held in the Musical Fund Hall, 808 Locust Street, Philadelphia, and the College of Pharmacy Building, Pride and Bluff Streets, Pittsburgh.

The practical examinations will be held on Saturday, June 24, in the Evans Institute, 40th and Spruce Streets, Philadelphia, and the University of Pittsburgh, Pittsburgh. The operative work will start at 8:30 A. M. and the prosthetic work at 1:30 P. M.

A partial examination will be held for students who have finished the work of the second year in college, on Wednesday and Thursday, June 21 and 22, in the same places. No others except second year students are eligible for the partial examination.

An examination will also be held for dental hygienists on Thursday, Friday and Saturday, June 22, 23 and 24. Only hygienists who have four years high school preliminaries are eligible for this examination.

Application papers may be secured from the Department of Public Instruction, Harrisburg. Any further information may be secured from

ALEXANDER H. REYNOLDS, *Secretary*,
4630 Chester Avenue, Philadelphia.

The Georgia State

The meeting of the Georgia State Dental Society will be held in Atlanta, Ga., June 14, 15, 16, 1922, instead of in Augusta, Ga., that date, as previously announced.

G. A. MITCHELL, *Secretary*.

South Carolina State Board

The annual meeting of the South Carolina State Board of Dental Examiners will be held at the Jefferson Hotel, Columbia, S. C., beginning at nine o'clock Friday morning, July 9th, 1922.

Application blanks and further information may be obtained from

W. K. WALKER, *Secretary*,
Orangeburg, S. C.

ANNOUNCEMENT

Official Special Train to National Dental Association Convention, Los Angeles, Cal., July 17-21, 1922

To All Officials and Members:

For the accommodation of those attending the twenty-sixth annual meeting of the National Dental Association at Los Angeles who wish to travel via the Colorado Rockies and Salt Lake City, or San Francisco, the Transportation Committee has completed arrangements for an Official Special Train from Chicago via the Chicago & Northwestern Ry., Union Pacific System and Denver & Rio Grande Western R. R., as outlined in the following schedule:

(Sleepers ready 9:30 p. m., Sunday, July 9.) Leave Chicago 12:15 a. m. (C. T.), Monday, July 10, C. & N. W.; arrive Omaha 1:45 p. m. (C. T.), Monday, July 10, C. & N. W.; leave Omaha 2:00 p. m. (C. T.), Monday, July 10, Un. Pac. Sys.; arrive Denver, 4:00 a. m. (M. T.), Tuesday, July 11, Un. Pac. Sys.; leave Denver 4:30 a. m. (M. T.), Tuesday, July 11, D. & R. G. W.; arrive Colorado Springs 7:00 a. m. (M. T.), Tuesday, July 11, D. & R. G. W.

(Day and evening to be spent in and around Colorado Springs, visit to Pike's Peak, Crystal Park Auto Trip, Manitou, Garden of the Gods, Cave of the Winds, etc. Sleepers ready for occupancy 9:30 p. m.)

Leave Colorado Springs 4:00 a. m. (M. T.), Wednesday, July 12, D. & R. G. W.; arrive Royal Gorge 7:00 a. m. (M. T.), Wednesday, July 12, D. & R. G. W.; arrive Tennessee Pass 12:00 noon, Wednesday, July 12, D. & R. G. W.; arrive Glenwood Springs, 3:15 p. m., Wednesday, July 12, D. & R. G. W.; arrive Salt Lake City 7:00 a. m., Thursday, July 13, D. & R. G. W.

(Six hours and fifty minutes stop-over at Salt Lake City.)

Leave Salt Lake City 2:50 p. m. (M. T.), Thursday, July 13, Un. Pac. Sys.; arrive Los Angeles 2:40 p. m. (P. T.), Friday July 14, Un. Pac. Sys.

Pullman fares from Chicago to Los Angeles or San Francisco, including stop-overs as indicated in this schedule, will be as follows:

Lower berth \$26.13. Upper berth \$20.90. Section \$47.03. Compartment \$73.75. Drawing room \$92.00.

A minimum of two adult fares is required for the exclusive use of a compartment or drawing room and one and one-half fares for a section.

Members of the Special Train party will return east via such route as each individual may prefer. Please select your own route according to the places you wish to visit, etc. The complete going and return route must be selected at the time tickets are purchased.

DR. D. C. BACON, *Chairman*, Transportation Committee,
31 N. State St., Chicago, Ill.

Vermont State Board

The next meeting of the Vermont State Board of Dental Examiners, for the examination of candidates to practice in Vermont, will be held at the State House, Montpelier, June 26, 27, 28, 1922.

Candidates will present for registration and preliminaries at 10 A. M., Monday, the 26th.

To be eligible for examination a candidate must be (1) twenty-one years of age, (2) a graduate of a high school of the first class, (3) a graduate of a reputable dental college.

Applications must be in the hands of the Secretary not later than June 16th.

For further information and application blanks, address

HARRY F. HAMILTON, *Secretary*.

Newport, Vt.

New York Alumni Reunion

A reunion of the Alumni of the New York College of Dentistry from 1867 to 1922 will be held on June 9th, 1922. Clinics at the college during the day and a banquet at a prominent hotel in the evening are contemplated. Program to be announced later.

SAMUEL H. SOLOMON, *Secretary Publicity Committee*.

1022 Trinity Avenue,
New York City.

Massachusetts State Board

There will be an examination held by the Massachusetts Board of Dental Examiners in Boston on June 26, 27, 28, 29, 30 and July 1. All applications for examination must be filed with the Secretary at least ten days before examination. For full particulars, application blanks, etc., address

J. N. CARRIERE, D.D.S., *Secretary*.

146 State House,
Boston, Massachusetts.

The American Society of Dental Radiographers

The annual meeting of the American Society of Dental Radiographers will be held at the Ambassador Hotel, Los Angeles, Calif., Wednesday and Thursday, July 19 and 20. The Program Committee has arranged for an interesting and scientific meeting. All those extremely interested in Dental Radiography are cordially invited to attend.

M. C. MCKITTRICK, *President*,

I. O. O. F. Bldg., Indianapolis, Ind.

MARTIN DEWEY, *Secretary-Treasurer*,

501 Fifth Ave., New York, N. Y.

Alabama State Board

The Board of Dental Examiners of Alabama will meet Monday, June 19, 1922, at 9 o'clock a. m., at the Birmingham Dental College, Avenue F and 20th St., Birmingham, Ala., for the purpose of examining applicants who hold diplomas from reputable dental colleges, for certificate of qualification to practice dentistry in Alabama.

All applications, accompanied by the examination fee, must be filed with the Secretary-Treasurer at least one week previous to the examination. For further information, application blanks, etc., address

H. CLAY HASSELL, *Secretary-Treasurer*,
616 22nd Ave., Tuscaloosa, Ala.

Iowa State Dental Board

The Iowa State Board of Dental Examiners will meet for the purpose of examining candidates for a license to practice in Iowa, at Iowa City, College of Dentistry, beginning Monday, May 29th, 1922, at 9:00 A. M.

An examination for Dental Hygienists will be given.

For further information and application blanks, address,

DR. C. B. MILLER, *Secretary*,
726 Fleming Bldg., Des Moines, Ia.

Indiana State

The Indiana State Dental Association will hold its sixty-fourth annual meeting at Indianapolis, Ind., May 15, 16, 17, 18, 1922, at the Claypool Hotel. All ethical dentists are cordially invited to attend. Dr. F. L. Gravis, Martinsville, Ind., is master of exhibits.

For further information write

A J. KIMM, *Secretary*,
704-5 Citizens Bank Bldg., Evansville, Ind.

Arkansas State Board

The Arkansas State Board of Dental Examiners will hold its regular meeting for the purpose of examining applicants June 19-20-21, 1922, Hotel Marion, Little Rock, Arkansas.

Applications may be secured by addressing the Secretary.

DR. H. J. CRUME,
Wilson Bldg., El Dorado, Arkansas.

Colorado State Board

The next meeting of the Colorado State Board of Dental Examiners will be in Denver, Colorado, June 6, 1922.

For further information address

WM. H. FLINT, *Secretary*,
Littleton, Colo.

South Dakota State Board

The next meeting of the South Dakota Board of Dental Examiners will be held at Sioux Falls, So. Dakota, commencing promptly at 1 p. m., Monday, June 26th, 1922. For further information and application blanks address

L. R. WALSTON, *Secretary*,
Redfield, So. Dakota.

American Dental Library and Museum Association

The next annual meeting of the American Dental Library and Museum Association will be held Monday, July 17, at the Hotel Ambassador, Los Angeles, Calif.

The membership consists now of over forty dental libraries, and we trust that all dental institutions owning a library will join same.

In order for the Association to accomplish its purpose it will be necessary and an advantage to all dental libraries to be members. Any institution or individual interested in dental literature or history are eligible for membership.

B. W. WEINBERGER, *Secretary*,
40 East 41st Street, New York.

Michigan Dental Examinations

The next examination in dentistry in this State will be held in the City of Ann Arbor, Dental College, the week of June 5th to 11th inclusive.

Application blanks, and all information relative to this examination, may be had by applying to Dr. E. O. Gillespie, 745 David Whitney Bldg., Detroit, Mich.

E. O. GILLESPIE, *Secretary*.

Tennessee State Board

The Tennessee Board of Dental Examiners will meet June 19, 1922, at 10:00 A. M. at V. U. Dental Department, Nashville, Tenn., for the purpose of examining all applicants (presenting proper credentials) who wish to secure license to practice Dentistry and Dental Hygiene. Applications and fees must be in hands of Secretary, ten days before meeting.

For application blanks, address, F. W. Meacham, Sec'y-Treas.,

911 Hamilton National Bank Bldg., Chattanooga, Tenn.

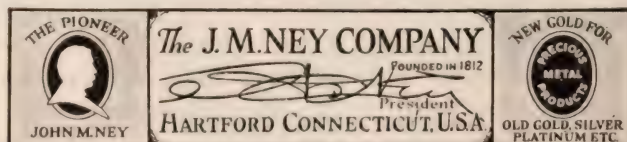
F. W. MEACHAM, *Sec'y-Treas.*



FOR over one hundred years, the name NEY on any precious metal product has denoted quality and adherence to standard. Ney's goods are uniform and strictly as represented—always.

We manufacture a greater variety of precious metal products for dental use than any other firm.

If there is any article in our vast assortment that you cannot obtain at your supply house, write to us and we will furnish you the names of dealers in your section who will be able to serve you.



NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

An Interesting Special Car Party to the Convention at Los Angeles, Cal., July 17th-21st, 1922.

Real enthusiasm has been shown relative to our special car party via Chicago, Denver, Colorado Springs, Royal Gorge, Salt Lake City, Feather River Canyon, San Francisco to Los Angeles,—returning through Yosemite National Park, the Shasta Route to Portland, through the Cascades to Yellowstone National Park, and thence home via St. Paul and Chicago. A wonderful trip offering the opportunity to see the beauties of the Pacific Coast, the Pacific Northwest and the two greatest national wonderlands, Yosemite National Park and Yellowstone National Park.

For attendance at the twenty-sixth annual meeting of the National Dental Association at Los Angeles, Transportation Chairman Dr. E. L. Pettibone, Chairman National Convention Committee, Ohio State Dental Society, 6503 Detroit Avenue, Cleveland, Ohio, has completed arrangements for this party to use a compartment drawing-room sleeper in conjunction with the Special National Dental Train de Luxe composed of highest class modern all-steel equipment, including buffet-lounging car, drawing-room, compartment and open section standard sleeping cars, dining car and observation-lounging car, routed from the palatial passenger terminal of the Chicago and Northwestern Railway via Omaha over the famous double-tracked, rock ballasted lines of the Chicago and Northwestern and Union Pacific System to Denver and the Denver and Rio Grande Western to Colorado Springs, where the first stop-over of one day will be made. The day and evening will be spent in and around Colorado Springs, Pike's Peak, on the Crystal Park auto trip, Manitou, Garden of the Gods and Cave of the Winds.

Departure from Colorado Springs is made permitting daylight trip through the Royal Gorge, the mightiest chasm in the world traversed by steel trains. Open top observation cars will be provided here to afford an unobstructed view of this scenic wonder. After an all day ride through the heart of the Rocky Mountains, over the Continental Divide and Tennessee Pass, through the canyons of the Eagle and Grande Rivers to Glenwood Springs and Grand Junction, we arrive at Salt Lake City the following morning. At Salt Lake City, time is permitted for a drive through the city, a visit to the Mormon Tabernacle and Temple Grounds, or a plunge in the Great Salt Lake at Saltair Beach. Traveling on to

San Francisco, we leave Salt Lake City at twelve-forty p. m. via the Western Pacific Railroad, the famous Feather River Canyon Route, arriving in San Francisco early the following evening. Our headquarters will be the Palace Hotel. Saturday will be spent here sightseeing, if you wish,—the morning by auto through the famous Golden Gate Park, Cliff House, Presidio, Marino, so forth. Afternoon—to Oakland and Berkeley, 14 miles by boat, 30 miles by auto, visiting University of California and the exclusive Piedmont residential section. Or an all day trip to Mt. Tamalpais and Muir Woods, with its virgin forest of giant redwoods, thousands of years old, from two hundred to three hundred feet in height. On the summit of Mt. Tamalpais, a wonderful view can be obtained of the Bay, San Francisco, Oakland, Berkeley, Alameda and surrounding country. Luncheon at the Tavern, Mt. Tamalpais. Or the day is left open for visiting friends, the shopping district or "just resting." Evening—the Chinatown sightseeing trip with experienced guides.

Sunday—a daylight ride over the Southern Pacific Coast Line—observation car attached—through Santa Barbara, Paso Robles Hot Springs—a road of a thousand wonders—arriving Los Angeles in the evening.

After the convention and visit in Los Angeles, we leave Friday night and arrive the following day at Yosemite National Park, valley of world-famed beauty—lofty cliffs, romantic vistas, waterfalls of extraordinary height, groves of big trees—large areas of snowy peaks and waterwheel falls—good trout fishing. A three day automobile tour of the Park, including 156 miles of railroad transportation from Merced to El Portal and return and 230 miles of motoring from El Portal to Yosemite, Hetch Hetchy Valley, Mariposa Grove of Big Trees, Bridal Veil Falls, all attractions of Yosemite Valley.

Leaving the Park, the journey is continued back through Frisco for connection with the Oregonian, a splendid train with observation car of the Southern Pacific for Portland, passing through the beautiful Shasta Mountains and climbing to the summit of the Siskiyou. An excellent view of Lassen Peak, the only active volcano on the North American Continent, is obtained and stop is made at Shasta Springs, adjacent to famous Mount Shasta.

At Portland, next day, a hundred-mile drive will be taken along the wonderful Columbia River Gorge over the most amazing automo-

ANNOUNCEMENT

To all Officials and Members National Dental Association
Contemplating Attendance at the

National Convention

Los Angeles, Cal., July 17-21, 1922

It is essential that you have the following information in planning your trip to the above meeting—

The route of the CHICAGO & NORTHWESTERN—UNION PACIFIC special train as arranged by the Transportation Committee affords the greatest number and variety of scenic attractions between Chicago and Los Angeles. Included among the places to be visited are Denver, Colorado Springs (where you will spend a day and evening), the famous Royal Gorge, Tennessee Pass, Glenwood Springs, Salt Lake City, (where one-half day will be spent in sight-seeing), the Rainbow Canyon, together with many other picturesque regions in the west.

The special train will leave Chicago from the palatial passenger terminal of the CHICAGO & NORTH WESTERN RY., 12:15 A. M., Monday, July 10th (sleepers ready at 9:30 P. M. Sunday, July 9th), and will consist of the highest class of modern all steel equipment, including Buffet-Lounging Car, Drawing Room-Compartment and open section standard sleeping cars, Dining Car and Observation Car. Arrive Los Angeles 2:40 P. M. July 10th.

Low Summer Fares---Liberal Stopover Privileges

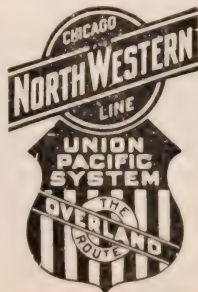
NOTE: The Chicago & North Western Ry. and Union Pacific System have arranged for a de luxe special train for the National Dental Golf Association and the American Society of Exodontists to leave Chicago 12:15 A. M. Monday, June 26th, arriving Los Angeles 1:40 P. M. July 10.

Special transportation arrangements have also been made by the National Society of Denture Prosthetists, for operating special sleeping cars via the Chicago & North Western Ry. and Union Pacific System, to leave Chicago 12:15 A. M. Monday, June 26th, arriving Los Angeles 12:05 P. M. July 1st. Stopover of a full day to be made at Colorado Springs, Colo.

Detailed information, descriptive literature and sleeping car reservations for all of the above trains may be secured by addressing the following.

H. E. SAUMBY, General Agent
C. & N. W. Ry. Co.
609 Swetland Building
CLEVELAND, OHIO

J. L. BURGAR, General Agent
C. & N. W. Ry. Co.
45 Ingalls Building
CINCINNATI, OHIO



W. H. BENHAM, General Agent
Union Pacific System
1204 Swetland Building
CLEVELAND, OHIO

W. H. CONNOR, General Agent
Union Pacific System
704 Union Central Building
CINCINNATI, OHIO

bile highway in the world, the Columbia River Highway. Autos leave at nine-thirty a. m. and return at five-thirty p. m. and from the heights a wonderful panorama of snowy mountain peaks is visible.

Seattle, the following day—a most interesting sightseeing tour will be taken around beautiful Lake Washington, the State University and city; also steamer ride to the Navy Yards at Bremerton. Beyond the Puget Sound, rise the snow-crowned Olympic Mountains.

That afternoon the train is boarded and the ascent of the western slope of the beautiful Cascade Range is begun. The train pierces the summit at Stampede Pass with a tunnel two miles in length. On both sides of the pass, there is very fine scenery, the Cascades presenting an impressive and attractive panorama. Beyond Spokane, we pass along the shores of the beautiful Lake Pend Orielle and through the famous Hell Gate Canyon. The line then plunges into the very heart of the wild Rocky Mountains, thence through the scenic and fertile Gallatin Valley to Livingston, the diverging point to Gardiner, northern entrance to Yellowstone National Park.

We will use the camps! Each camp is located at a center of tourist interest. In other words, the five great camps are located in five widely separately, sightseeing districts. Each camp site was selected with special reference to scenic outlook. All of the camps, excepting the Mammoth Camp, are located on the edge of great forests. Mammoth Camp is located on a broad terrace in plain view of the Hot Springs. In the center of each camp, rise large service buildings, which house lobbies, business headquarters, dining halls and social assembly halls. Surrounding these units, usually under the pines and firs, is a "Tent City" or village of cozy canvas bungalows, with private sleeping rooms—one, two and four room capacity. Wholesome food, well cooked, is served in large, rustic dining halls. The waitresses are young girls from colleges and best American homes. All sleeping tents are framed, floored, wainscoted, and heated by wood-burning stoves. The furnishings, while simple, are absolutely comfortable. The beds are of the best quality, full size. A hostess at each camp looks after the comfort and convenience of women guests. The atmosphere of the camps is clean, informal and pleasurable. There is nothing rough or coarse. There is no "dressing up." The camps enjoy traditions which extend back for more than a generation. These traditions supply many little features of service and entertainment that are unique.

Automobiles take the party to Mammoth Hot Springs arriving there in time for lunch. The afternoon will be spent going over the great terraces and formations and many other attractions. The general panorama here is one of the most striking in the Park. Then

we pass on through the magnificent Golden and Silver Gate Canyons, Norris Basin, Mammoth Paint Pots and Fountain Geyser. Upper Geyser Basin contains five miles of the greatest geyser region in the world. Some are literal volcanoes of water. Old Faithful, the most famous of all geysers, hurls in the air each day enough water to supply a city of 300,000 inhabitants. Many beautiful springs are in the near vicinity. The automobile trip over the Great Continental Divide is one of the wonders and of constant variety. Each wonder spot sees but the prelude of something more inspiring. Yellowstone Lake, elevation 7,741 feet, the second highest lake in the world, and the Absaroka Range of snow-capped mountains is seen to exceptional advantage. The Grand Canyon and the flories of the Great Falls are such that language is entirely inadequate to convey a just conception of the grandeur and sublimity of the most beautiful of nature's handiwork. One of the most thrilling rides in the park is that from the canyon to the summit of Mount Washburn. The view is marvelous and one obtains as in no other way an accurate idea of the Park as a whole. Passing through beautiful Dunraven Pass, a most interesting view of the Grand Canyon and the equally impressive Tower Falls is seen. Dinner at the Mammoth Hot Springs.

Leaving the Park, the special sleeper will be parked ready for the return trip to Gardiner. Wednesday, August second, and as we pass east of Billings, we go through the famous Pyramid Park (Bad Lands Region) where Roosevelt ranched, and into the beautiful Minnesota Lake Region.

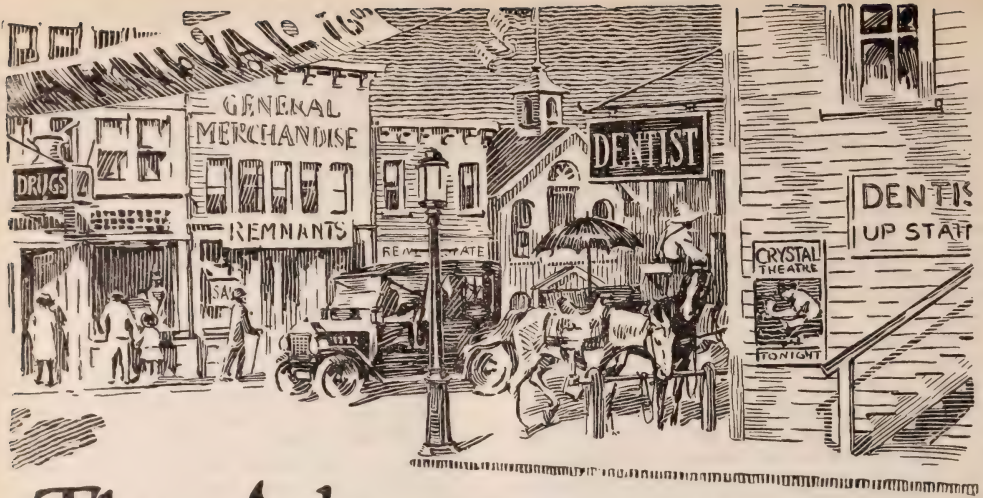
From St. Paul, via the "North American" of the Chicago and Northwestern, the day is spent through the State of Wisconsin, traveling via Eau Claire and Milwaukee past the Great Lakes Naval Training Station and Fort Sheridan, famous during the World's War, into Chicago in the evening through the North Shore Suburban District.

Special attention will be paid to entertainment en route, a Victrola and a radio of large capacity will be carried.

E. L. PETTIBONE.

The Nashville Dental Society devoted its February meeting to a paper and discussion on the subject "The X-Ray as a Diagnostic Agent." The subject indicates that the Nashville people are taking precisely the correct slant at the X-ray. As a diagnostic "agent" it is invaluable. As the sole source of diagnosis, it has led to much unconscious malpractice and great injury to patients.

A bill has been introduced in the New York legislature to prevent the sale of candy to children of thirteen and younger without consent of parent or guardian. Good business. Should be done everywhere.



This Advertisement

was written by a Dentist in a Country Town

Is he right?

WHEN Dr. Crouse started his publicity campaign, there were many Ah's and Oh's, and much cussing in certain circles, but those who cussed loudest stayed to read the Digest and took their medicine, and a great many of them are now believers.



*Sammie Cockerill
wants to know why
you—*

Within the last six months seven well satisfied wearers of Trubyte Teeth have made this remark to me: "Doctor, why don't the manufacturers of these teeth advertise to the public the superiority of their teeth like the tooth paste manufacturers do?"

We see advertisements of other staples, and false teeth have become a staple article, why do they not feature them in the magazines?" I have tried to explain to them but failed, as there is no reason why you should not.

These were not all my patients; one from M—— whom Dr. Bradley fitted with a full denture on aluminum base asked me the same question. Sammy Cockerill, my star patient and booster for Trubyte Teeth, asks me why the manufacturers do not advertise those teeth in the Saturday Evening Post



*Old Mrs. Watkins
asks why—*

and let the people know how much better they are than the ordinary teeth? Old Mrs. Watkins who lives forty miles from here, and whom Dr. Humphreys fitted with a full denture, asks why she can't find them advertised in the papers so that she can show same to her friends?

I think I hear you say, "Son, it can't be did." Well that's what they told the originators of Trubyte Teeth when they planned to bring 'em out, but you did it and if you want to create a better demand for

your teeth get your advertising to the public as well as to the dentist and you will have to enlarge your factory. However, at the time such a campaign was started a missionary should be sent to members of the profession who so far have not taken any interest in the P. G. Courses, and who for the most part live out in the smaller towns. Those boys are the ones who are doing the real work, and out

of a total registration in this state of approximately 1,600, about 300 attend the P. G. Courses. Eliminating 300 more who for various reasons would not be considered. What about the other 1,000?

Technic as carried into the offices of these boys should be very simple; we have a number down here that could be demonstrated in an hour; not so much stress laid on the impression but more on the

taking of the bite and the set up of the teeth. Ninety per cent of the dentists depend altogether on the impression to secure results, and too little attention to the taking of the bite and the setting up of the teeth. If a little time was taken in demonstrating to these fellows that it is possible to really make a set of dentures that will fit and give service, fifty per cent of them would never stop until they had been all the way to your school. Now you don't have to come to Oklahoma to start your

missionary work, just walk down street and step into the first office (Dental, of course), that you see and ask how many of the dentists there can take a correct bite and set up the teeth correctly in a full denture case. They will all say they can, but watch them and see if they can make good. Many of them have had instruction but still find the technic too confusing. As to the materials used I will say this, that with

the materials in any country dentist's office I can take an impression and bite which will improve his work fifty per cent.

Anyone who has had a course of instruction can do this, and I believe if a missionary was sent to them you would see a big addition to the membership in the National and State Associations, and many would enter college again, especially the younger ones, although



"I never saw such an enthusiastic guy!"

the membership at this time is mostly middle-aged men. I will illustrate: Three years ago I telephoned to Dr. Humphreys and said, "Come on up to the State meeting." He demurred, said he was busy on plates that he had to make over. I said, So am I, but let us go up and ask Dr. Campbell what is the matter with our plates. I had already had some work done under him and wanted more, so we traveled up to take his instruction. I never saw such an enthusiastic guy in my life as Humphreys was on his return, and soon I missed him and found he was in Chicago taking conductive anesthesia; he came back with an X-Ray machine which set him back \$1,100, but which has proved a good investment, and he is located in a country town of less than 1,800 and only fifty miles from Fort Smith and thirty-five from here. On the other hand, when Dr. Campbell invited the whole Eastern District society to hold its meeting in his office a year later nine of us showed up and five were from this county. And I wish to say here that Dr. D. Campbell is one of our idols down here.

Dr. Campbell's office is on the upper floor of the Shukert Bldg. in K. C., and during a lull in the proceedings I slipped down the street to see an old friend of mine who is a good, conscientious dentist, although not as progressive as he might be. He has a nice practice and good location and could build a beautiful practice if he cared to do so. He asked me what we were doing up there and on telling him he said, "Well, you guys must have a lot of money to throw away." Then he said, "I wish you would

tell me what is the matter that I can't get this plate to fit. I have made it over three times." Well, I could have shown him in five minutes but I did not try to. The impression was bad enough but he could have gotten by with it had he properly set up the teeth, and still he persisted in a straight-line set up not caring to learn any better. Still, I believe a little missionary work would have won him over into the ranks of the progressives.

I have under construction at present five full dentures and three single upper ones, one of which is a duplicate plate which measures three inches across posterior and



"—although he dry smokes his cigar."

two and three-quarter inches from tip of incisor to posterior, using your 1H long square, and on which another dentist failed absolutely. One of the finest cases to fit up that I ever saw, although the patient "dry smokes" his cigar and keeps continually chewing over the cuspid region. The other man claims to be an expert on dentures at that.

In conclusion I wish to say that I do not wish to be thought presumptuous. I am only expressing what the laity are saying to me and which I thought should be brought to your attention.

Respectfully,
(Signed) R. E. M.

DR. J. H. MORRISON,

Dean of the Eastern Indiana Dental Society
Honored.

Our friend, Dr. G. E. Stevenson, of Liberty, Ind., sends us the following account of a meeting that took place at Connersville, Ind., April 20.

Thirty-five members of the Eastern Indiana Dental Society met yesterday afternoon, at two o'clock, and all those in attendance were of the opinion that this year's event was of more importance than any other meeting ever held. The afternoon meeting was devoted to a clinic, conducted by Dr. R. C. Leslie, of Cambridge City. Afterwards officers were elected. They were Dr. Hinshaw, president; D. George E. Stevenson, of Liberty, president-elect, and Dr. Chittin, of Richmond, secretary.

At the evening session Dr. N. S. Cox, of Richmond, read a paper entitled "Facts, Fads and Fancies of Dentistry Today."

Dr. J. H. Morrison, one of the pioneers of dentistry, was the honored guest. Special attention had been directed to him and his life in the program. Owing to illness, Dr. Morrison was unable to be among the guests but sent his sincere regrets. In honor of this venerable man, tribute was paid to his career. Dr. H. S. Cox presided at this session and delivered a brief address of appreciation, followed by hearty responses on the part of each man present. Dr. George L. Masters, a local dentist and life-long friend of Dr. Morrison, read a beautiful tribute to the honor guest. A telegram from Dr. F. R. Henshaw, dean of the Indiana Dental College at Indianapolis, was read, expressing regret that he could not be among those present to greet Dr. Morrison. A beautiful bouquet of flowers was presented to Dr. Morrison by a committee composed of Dr. H. M. Zehrung, Dr. George Masters and Dr. Fred McCombs.

Part of the text of Dr. Master's tribute to Dr. Morrison follows:

There is something lofty, and fitting, in the compulsion that bids us gather together, today, and pay tribute to the life and labors of our esteemed friend and co-worker, Dr. J. H. Morrison. In the silent places of all our hearts there is that sincere appreciation for this man and his labors that cannot be put into speech. If all of us joined voices to speak our feelings to the full, we should be accused of flattery, or of some other motive not in keeping with the tradition and spirit of professional men.

Dr. Morrison lives in the midst of us as an honorable standard bearer of our distinctive profession. We delight to honor him, because, by his life and labors, he honors us. Our profession is all the better, and its standing is all the more secure because it

boasts the enlistment of this good man, and of others like him. Character and personality are as vital and valuable to Dentistry as they are to any other profession; and, it is to the glory of our profession that it can point to men like Dr. Morrison, and while pointing to them say to the younger generation that are seeking their life work, "Take up dentistry, it is a labor of respectability, a labor of usefulness, a labor of love, and a labor that develops character and personality which matches well with the character and personality developed by any other trade or profession." In this invitation to the younger generation we are simply voicing our rightful boast of the profession by which we live, and through which we serve.

Ours is a labor of respectability, and for that reason, Dr. Morrison has given the best years of his life to it. One would be hard put to imagine Dr. Morrison identified with any kind of labor that was not clothed with respectability. This man would instinctively choose a labor that would give him respectable standing among his fellowmen; and, he would never be satisfied to give his life and strength to a labor that did not promise to increase in respectability as the years went by. And, it has been this man's joy to see his chosen profession gaining in respectability with every added year. Ours is a labor of usefulness; and, perhaps no one among us has a firmer faith in its usefulness than Dr. Morrison himself. To live, as he has lived, with the consciousness that he has contributed to the health and beauty of his generation is to be possessed of a satisfaction that nothing can take away. Ours is a labor of love; and, when all the other motives for our labor are analyzed and set aside as secondary the motive of love remains and we make the discovery that our keenest joy arises from the knowledge that we have eased pain and have added to the health and happiness of our patients through our service. And, as Dr. Morrison takes thought of the long, long line of people who have come to him for relief and have gone away leaving their pain he must feel a deep glad sense of certainty this his devotion to duty had not been wasted or lost. From a professional viewpoint alone we have a right to ask the world at large to name a profession that turns out, on the whole, better men than are to be found among the best men of our own profession. The Eastern Indiana Dental Society has no apology to offer for the professional grace and dignity of Dr. J. H. Morrison; and while much of his character and personality is native to the man himself, we still believe that he has gained much of his professional grace and dignity from his long association with dentistry; and we know that he has added much to the dignity and helpfulness of the profession.

Come Along Fellows! Climb Aboard and Let's Go!

Northern Ohio Dental Association

June 5 - 6 - 7, 1922

Summer Post-Graduate Course June 7 - 8 - 9

Hotel Statler, Cleveland Ohio

PROGRAM

Monday, June 5th, 1922.

9:00 a. m., Registration; 10:00 a. m., Meeting of the Executive Council; 11:30 a. m., the W. E. Cummer Class Luncheon; 1:30 p. m., President's Address, Dr. J. J. Welker; 2:15 p. m., Dr. C. C. Sparrow, Minneapolis, Minn., "Fixed Bridge Work"; 3:30 p. m., Dr. W. E. Cummer, Toronto, "Partial Denture Construction"; 8:00 p. m., Dr. E. V. McCollum (Johns Hopkins University), "Diet in Relation to the Teeth."

Tuesday, June 6, 1922.

9:00 a. m., Clinics—Dr. W. E. Cummer, "Partial Denture"; Dr. Geo. A. Thompson, "Porcelain Jacket Crown"; Dr. C. C. Sparrow, "Fixed Bridge Work"; Miller Study Club, "Full Dentures"; Toledo Study Club, "Gold Inlays"; 1:30 p. m., Dr. Geo. A. Thompson, Chicago, Ill., "Porcelain Jacket Crown"; 2:45 p. m., Dr. W. E. Cummer, "Partial Denture Construction" (Continued); 4:00 p. m., Dr. C. C. Sparrow, "Dental Economics"; 7:00 p. m., Dinner-Dance.

Wednesday, June 7, 1922.

9:00 a. m., Clinics. The Clinics will be the same as Tuesday.

Dr. Cummer will conduct a post graduate course at the Hotel Statler, beginning Wednesday noon and finishing Friday evening. This work will be a continuation of lectures and clinics given before the general assembly. These extra lectures will be given to a limited class and will deal with advanced ideas and engineering principles as only Dr. Cummer can give them.

A fee of \$25.00 will be charged for this course.

Dr. J. V. Gentilly, 809 Schofield Building, will have charge of this class.

Don't forget the Star Event—the Big Golf Tournament.

DEATHS.

DR. GEORGE HENRY WILSON

Too late for a fitting obituary for this issue there comes to us the news of the death of Dr. George H. Wilson, at the home of his son, Dr. Harris R. C. Wilson, at Cleveland, Ohio, on Wednesday, April 12, 1922, aged 67 years.

Although he had been ill three weeks, the end came suddenly, as Dr. Wilson had been convalescing.

Surviving are two sons, Dr. Harris R. C. Wilson, director of the Cleveland Mouth Hygiene Association, and Prof. Paul L. Wilson, Selma, Cal., and a sister, Mrs. Etta Van Valkenburg. Dr. G. H. Wilson was a brother-in-law of Rev. Harris R. Cooley, former director of public welfare.

An adequate account of Dr. Wilson's life and work for dentistry will appear in our June issue.

At St. Paul, Minn., March 13, Dr. Wayne B. Corser, aged 40, was found dead in his office under mysterious circumstances. A gas nose-piece was in place, his clothing was nearly all torn from his body, and twelve large photograph clips were found attached to his body in such manner as to have caused intense suffering. Dr. Corser was prosperous, his affairs were found to be in excellent condition, and no cause for suicide can be conceived. At last accounts the police were entirely without opinion or clue.

At Brooklyn, N. Y., March 16, Dr. Robert Brandt, aged 47.

At Maysville, Ga., March 17, Dr. W. G. Sharp, 53.

At Woonsocket, R. I., March 18, Dr. Herbert A. Thrift, 32.

At Germantown, Pa., March 20, Dr. J. M. Banzhaf, 36.

At Lebanon, N. H., March 21, Dr. Frederick H. Brown, 58. Dr. Brown was president of the State Dental Society, a member of the Board of Examiners and of several dental organizations. He was well known as an inventor.

At New York City, March 22, Dr. Dana B. Bratt, 48.

At Harrisburg, Pa., March 22, Dr. Alvin A. Smeigh, 45. He formerly practiced at Palmyra, Ill.

At Newcomerstown, Ohio, March 20, Dr. S. F. Miskimen, 53.

At Salina, Kans., March 25, Dr. Victor McKee, 35.

At Madison, Ind., March 23, Dr. Lucy D. Montz, of Warsaw, Ky., 79. She was a graduate of the Ohio college, and had practiced successfully for many years.

At Marengo, Ill., March 13, Dr. Perry A. Barney, 44.

At Syracuse, N. Y., April 2, Dr. Charles

E. Cherry, dean of Syracuse dentists, 81. He had practiced for more than fifty years.

At Lowville, N. Y., April 3, Dr. William A. Kelly, 66.

At Statesville, N. C., April 1, Dr. Leonard White, 60.

At Salem, Ind., April 5, Dr. John L. Williams, 88. He was the oldest practicing dentist in Indiana.

At Truro, Que., Can., April 5, Dr. M. K. Langille, 65.

At Athol, Mass., April 8, Dr. Nathan S. Marshall, 56.

At Jacksonville, Texas, April 6, Dr. John N. Sligar, 81.

At Columbus, Ohio, April 11, Dr. George Fuerstein, 45.

At Northampton, Mass., April 13, Dr. Andrew J. Flanagan, 56.

At New Orleans, April 1, Dr. O. A. Glidden, in his seventy-seventh year.

Dr. Glidden was generally recognized as the ablest gold demonstrator that America ever produced. He originally came from Oneida, New York, where he practiced dentistry until he took up the demonstrating of gold about 1900, having demonstrated Watt's Crystal Gold for the A. J. Watts Company for about twelve years, DeTrey's Gold for two years, and Morgan-Hastings' Extra Pliable Burnished Gold Cylinders for the last eight years. He was the inventor of the famous Gates-Glidden Drill.

He was known among the better class of dentists all over the United States, who will miss his helpful visits.

A council of students has been formed in the Atlanta-Southern Dental College, for the purpose of self-government and cooperation with the faculty, similar to that already existing in other colleges. P. H. Kapp is president, and G. M. Shields, vice-president and secretary.

Dentists of Lake county, Illinois, have organized to teach oral hygiene in all the schools in the county during the next few months. That's the way to do it. Everybody get together and work. No need fear that there'll not be enough to go 'round.

There are fifty-two dental schools connected with universities and colleges in the United States. The Carnegie Foundation is sending representatives to inspect all of these, with the possible idea of rendering financial assistance where needed.

Commissions, "split-fees," and all such methods of increasing the dental income, are declared altogether unethical by Dr. C. N. Johnson, the "Father of Dentistry," speaking before the Minnesota state convention at Minneapolis, February 23.

ANNOUNCEMENT

To the Dental Profession:

You will no doubt be interested in learning that we have acquired by purchase the stock, good-will and lease of the long established and very favorably-known Dental Supply House of Mrs. W. M. Herriott & Son, 237 North Pennsylvania Street, Indianapolis, Indiana, and that we are continuing the business at the same location, without interruption or delay in service.

With fifty years' experience to our credit; with the purchasing power of eight large houses—Toledo, Cleveland, Detroit, Grand Rapids, Columbus, Akron, Flint, and now Indianapolis—we have every reason to believe that we can serve you intelligently and well, putting at your command a diversity of stocks found only in dental depots of the first class.

Our Mail-Order Service has been famous for years in the territory served by us. "It goes by ~~the~~ next train always," has been our slogan since 1872, and shall continue to be our ideal, which we shall attain whenever circumstances entirely beyond our control do not make it impossible.

We are placing in charge of our new House, Mr. Carl S. Wright, one of our stockholders, and a man of long experience in our business in many capacities. Associated with him will be some of the most capable of the Herriott organization.

There has been and shall be no interruption in the operation of our Laboratory which is amply manned and equipped. Laboratory orders are solicited, with the assurance that they will be given the same intelligent and painstaking care that has been characteristic of the Herriott Laboratory.

We want you to make the acquaintance of the new management; to think of our Depot as you have been thinking and feeling toward that which it supersedes—as YOUR own source of supply, where your needs and desires are paramount, and where nothing shall be left undone to earn your good will.

Sincerely,

THE RANSOM & RANDOLPH CO.

Pennsylvania—State

Pittsburgh, April 12.—The fifty-fourth annual convention of the Pennsylvania State Dental Society opened yesterday. More than 1,200 dentists were registered and 1,000 more are expected today.

Addresses were made at the opening session yesterday morning by Dr. S. B. Linhart, secretary of the University of Pittsburgh; Dr. Emerson R. Sausser, of Philadelphia, vice-president of the society, and Dr. John B. Biddle, of Pittsburgh, president.

The opening was preceded by the annual meeting of the Odontological Society of Western Pennsylvania, an adjunct of the state organization, with Dr. W. E. Mendel, of Pittsburgh, presiding. Officers elected, all of Pittsburgh, were: H. J. Horner, president; B. P. Rial, vice-president; C. R. Gorman, recording secretary; Leslie Waddill, corresponding secretary, and H. C. Metz, treasurer.

The afternoon session was featured by a lecture on "Gold Inlays," by Dr. R. H. Volland, of Iowa City, Ia., illustrated with lantern slides, demonstrating qualities of wax for impressions and methods of casting the gold. The subject also was discussed by Dr. C. S. Van Horn of Bloomsburg, Dr. E. C. Thompson, of Warren, Dr. A. E. Bard, of Pitts-

burgh, and Dr. Edwin Shoemaker, of Philadelphia.

Dr. Thomas B. Hartzell, of Minneapolis, Minn., president of the National Dental Association, lectured on "When to Conserve and When to Destroy the Dental Mechanism" last night dealing with the relation of nutrition to infection and bacterial growth, and the necessity of deep study of each case before making the final decision to remove or retain the masticating mechanism.

Dr. Emerson R. Sausser, of Philadelphia, was elected president; W. L. Fickes, of Pittsburgh, first vice-president; O. J. Specker, of Reading, second vice-president; A. C. Barclay, of Pittsburgh, recording secretary; Z. T. Zackaway, of Philadelphia, assistant secretary, and A. B. Miller, of Kingston, treasurer. Drs. Biddle, W. E. Mendel and B. P. Rial, all of Pittsburgh, were elected to serve a one-year term as members of the society's council.

Dr. Howard Raper, of Indianapolis, has formed a connection for the purpose of opening a dental radiographic school at St. Louis. Dr. Raper is at present on a lecturing tour that will cover all principal cities. Radio-diagnosis will be one of the subjects taught in the new school.

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Essential Instruments In Pulp Canal Preparation.

Opens up Canals and Removes Debris

In three styles of six sizes each



Style A—To use in Broach Holder



Style B—To use in Thumb and Finger



Style D—With $2\frac{3}{4}$ inch Handle

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DETROIT DENTAL MANUFACTURING CO.
DETROIT, MICHIGAN

IPANA TOOTH PASTE

Heals Bleeding Gums

—A dentist's recognized assistant

IPANA is a pleasant tasting and efficient cleansing tooth paste and because of its Ziradol content is a very real ally to professional treatment of the gums and teeth.

Modern dentistry has found Ipana to be an effective healing agent in oral conditions—restoring soft, spongy and bleeding gums to normal.

It is absolutely free from gritty substances—cleans without injury—and its taste is smooth, snappy and delightful.

Write today for a professional package.

BRISTOL-MYERS CO.

48 Rector Street

New York City

Makers of SAL HEPATICA



Michigan—State

The 1922 meeting of the Michigan State Dental Society held at Detroit on April 4-5-6, was one of the most successful in every way—attendance, program, interest and good feeling—ever held in the state. The program was as nearly perfect as it well could be, presenting papers by such masters as Wallace Secombe, L. D. S., D. D. S., Royal College of Dental Surgery, Toronto, who spoke on "Essential Elements in Successful Dental Practice" and "Diet in Dental Practice"; C. C. Sparrow, D. D. S., Minneapolis, Minn., "Dental Economics" and "Crown and Bridge Work"; Mrs. Frank Rosenblatt, Detroit, "Thrift"; Albert L. LeGro, "Essentials to Dental Success"; C. N. Johnson, Chicago, "Operative Dentistry"; O. H. Merritt, New York, "Prevention of Oral Diseases"; Chalmers J. Lyons, Ann Arbor, "Diagnosis of Dental Infections"; Edgar D. Coolidge, Chicago, "Filling Root Canals," and many others, including local men of note. The clinics were simply tremendous in number and scope. Dr. Russell W. Bunting presided in a most acceptable manner.

The following officers were elected: William H. Elliott, president; J. H. Taylor, of Flint, president-elect; W. W. Gibson, of Grand Rapids, vice-president; P. J. O'Reilly and Charles Lane, of Detroit and, Clare G. Bates, of Durand, members of the executive committee.

Tennessee-Virginia—Southwest

Bristol, Va.-Tenn., March 19.—Dr. W. M. Sexton, of this city, was last night elected president of the East Tennessee and Southwest Virginia Dental Society at the annual business session of the body held here. Other officers elected at the meeting were, Dr. W. G. Hutchinson, of Kingsport, vice-president; Dr. H. G. Cunningham, of this city, secretary, and C. M. Quillon, of this city, treasurer. The retiring president of the organization is Dr. Gordon Barkley, of this city.

The society decided to hold four meetings yearly in Bristol, and the next meeting will be in May.

Vermont—State

St. Albans, March 21.—At the Vermont Association meeting at Burlington Saturday the following officers were elected: President, Dr. O. S. Nims, of Burlington; first vice-president, Dr. F. S. Braley, of Bennington; second vice-president, Dr. C. H. Cole, of Vergennes; secretary, Dr. C. R. Woods, of Rutland; treasurer, Dr. Thomas Mound, of Rutland; executive committee, Dr. C. M. Richmond, of St. Johnsbury, Dr. H. B. Small, of Burlington, and Dr. Earl Johnson, of Rutland.

The Child Welfare League, Oil City, Pa., has established a free dental clinic.

Arkansas—State

Little Rock, March 22.—The three days' convention of the Arkansas State Dental Association was concluded Wednesday morning with a free clinic.

Dr. T. J. Newman, of Little Rock, Tuesday night was elected president of the association. Other officers elected were, F. P. Travis, Osceola, president-elect; Dr. J. D. Deaton, Stamps, first vice-president; Dr. W. E. Hutchinson, Dermott, second vice-president; J. T. Peay, Little Rock, secretary, and Dr. C. G. Jernigan, of Little Rock, member of the Board of Dental Examiners.

The opening session of the convention was held Monday. The address of welcome was delivered by Clarence P. Newton, secretary to Governor McRae, and a response was given by Dr. G. C. Jernigan, of Rector.

The afternoon program included a lecture on "Mastication" by Dr. T. B. Hartzell, Minneapolis, president of the National Dental Association, and a lecture on "Diet for Health, Comfort and Efficiency" by G. E. Harter, of Toledo, O.

The annual banquet was held Monday evening at the Elks Club.

Tuesday morning Dr. E. L. Miley gave a clinic on "Pulpotomy," followed by a paper by Dr. George L. Powers, Memphis, president of the Tennessee State Society on "Profes-

sional Conceptions and Standards." Clinics by Dr. John J. Ogden, of Memphis, and others closed the morning session.

While the morning program was in progress, Mr. G. E. Harter, of Toledo, O., spoke at the Little Rock High School on "Digging Our Graves With Our Teeth," before an audience of about 1,500.

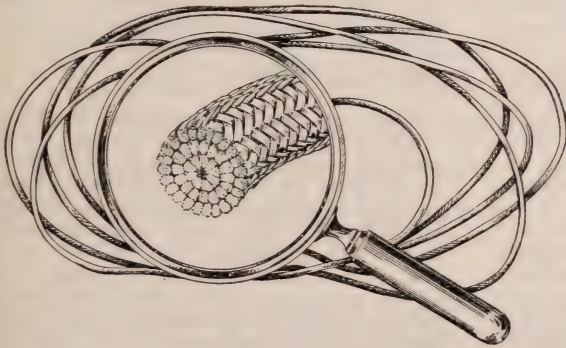
On Wednesday morning clinics were presented by Drs. J. R. York, A. F. Chambers, W. T. Kelton, H. J. Green, F. G. White, F. C. Johnson, Jr., E. H. Johnson, E. L. Miley, F. P. Travis, J. T. Newman, J. D. Jordan and W. S. Hannah.

A paper was read on "Earning and Handling the Dental Income" by G. E. Harter, of Toledo, Ohio, after which the convention adjourned to meet at Little Rock in 1923.

Michigan—Twelfth District

Petoskey, March 23.—The Twelfth District Dental Society's meeting was largely attended from all sections of northern Michigan. Dr. H. B. Watson, of Grand Rapids, was the principal speaker.

New officers elected are: President, G. A. Parmenter, Petoskey; vice-president, A. E. Sangster, Cheboygan; secretary and treasurer, W. W. Mitchell, Charlevoix; member state board dental examiners, F. A. Graham, Harbor Springs.

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Indiana—East Central

Muncie, Ind., March 24.—Dr. J. Frank Cofield was elected president, C. V. Hall, vice-president, and C. C. Jones, secretary, at the annual meeting of the East Central District Dental Society yesterday. All the new officers are Newcastle men.

The meeting was one of the most successful ever held by the society which has members in Delaware, Randolph, Henry, Madison, and Blackford counties. During the afternoon, clinics were conducted by members of the Muncie Dental Society. At 6 o'clock an elaborate appointed banquet was served.

At the evening session, Dr. Frederick Henshaw, dean of the Indiana Dental College, and Dr. Lon F. Smith, both of Indianapolis, were among the principal speakers. Dr. B. R. Kirklin, Dr. C. M. Mix and Dr. R. H. Beeson, Muncie physicians and surgeons, also spoke. Drs. Mix and Beeson talking on "The Relation of Dental Infections to Surgery." Dr. Kirklin talked on "The X-ray and Its Advantages to the Dental Profession."

Indiana—Fort Wayne District.

Fort Wayne, March 22.—Dr. J. E. Graham, of Auburn, was elected president of the Fort Wayne District Dental Society, in an all-day meeting of the society held yesterday at the James Knapp Dental coterie. Other officers elected were: Dr. J. M. Rosenthal, of Fort Wayne, vice-president; Dr. J. F. Brenneman, Columbia City, treasurer; Dr. H. T. Berkey, Fort Wayne, secretary. The newly elected officers will take office on July 1.

The opening address was delivered by Dr. R. E. MacBoyle, of Chicago, who holds the chair of crown and bridge work at the Chicago College. The subject of his address was, "Fixed Bridge Work and a Demonstration of the Technic in the Construction of 'New Abutment Pieces'."

At the afternoon session Dr. Earl Brooks, of Noblesville, president-elect of the Indiana State Dental Association, spoke in the interest of the state association. A demonstration of new technic in bridge work was made by Dr. L. W. Dailey, of Bluffton. A short address was delivered by Dr. MacBoyle.

Michigan—Second District

Jackson, Mich., March 7.—Dr. Grover W. Dunham, of Albion, was elected president of the Michigan Second District Dental Society, Tuesday night, at the annual meeting here.

The names of Dr. William C. Leggett, Dr. Ward Howlett and Dr. B. M. Adams, all of Jackson, were recommended for submission to the state dental examining board as prospective examiners.

Dr. Marcus Ward, dean of the University of Michigan dental school, gave the principal talk of the meeting.

Indiana—Western

Terre Haute, Ind., March 9.—The Western Dental Association closed its annual conference here yesterday. D. A. House, of Indianapolis, discussed "Crown and Bridge Work" Wednesday. Clinics were held in the afternoon. Other conference speakers were A. A. Spears, president of the organization; J. C. Schwartz, St. Louis; Earl Brooks, Noblesville, and Robert Gillis, Hammond.

Texas—State

Houston, March 15.—The forty-second annual convention of the Texas State Dental Society closed at the Rice Hotel Tuesday, after Fort Worth had been selected as the place for holding the 1923 convention. Officers to serve during the coming year were elected as follows:

President, Dr. A. L. Frew, of Dallas; first vice-president, Dr. W. O. Talbot, of Fort Worth; second vice-president, Dr. W. C. Neal, of Abilene; secretary and treasurer, Dr. J. G. Fife, of Dallas; member of the executive committee, Dr. J. J. Simmons, of Dallas; member of the dental board committee, Dr. George P. Barnes, of Palestine.

Delegates to attend the annual convention of the National Dental Society, to be held at Los Angeles, Cal., in July, were appointed as follows:

Dr. J. O. Hall, of Waco; Dr. A. L. Frew, of Dallas; Dr. J. M. Murphy, of Temple, and Dr. E. W. Smith, of Dallas. The alternates are Dr. Allen W. Kearby, of Dallas; Dr. W. H. Scherer, of Houston; Dr. G. Waller Staples, of Dallas, and Dr. Irwin Houston, of Corsicana.

Walter A. Unger, 27, secretary in charge of funds of the Evans Dental Institute, Philadelphia, was sentenced, March 24, to eight years in the state penitentiary for misappropriation and loss of money and securities to the amount of \$175,000. The money was dissipated in bucket-shop gambling. Too bad that the men who robbed Unger cannot be given a touch of the same legal stick. Don't monkey with stocks and bonds, whether you have your own money to lose or otherwise. The game is too big for any of us who must work for our money, and it is gambling, and not investment in any sense of the word.

My old friend, Dr. Charles A. Priest, of Marion, Ind., is to have a place on the program of the National at Los Angeles. He can tell 'em something about amalgam, and I hope he does it.

Gov. Alf. Taylor, of Tennessee, has reappointed Drs. George S. Powers, of Memphis, and S. W. Meacham, Chattanooga, to another three-year term as members of the Tennessee State Board of Examiners.

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Your copy will be sent you by your dealer upon receipt of twenty-five cents in postage to help defray expense of printing and mailing. Or order direct from us.

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I am having many calls for talks on dental economics, and need all the information that I can get on the subject. Just now I should like to know the proportion that the cost of dental practice bears to total receipts. Of course, every man who reads this knows what his total practice amounted to last year; he also knows what his total costs were. Will a few of you kindly let me know the percentage of your costs? I am not at all curious about your total income, or your net income. All I want is the percentage of costs. If you did a practice of \$3,000 gross, and your costs were a total of \$1,200, then your percentage of cost was 40. That is what I want to know.

A new method of painless dentistry, the genuine thing this time it is alleged, is being tried out in London. The process is to spray oxygen on the area to be operated, first at body temperature, then gradually lowered until the tissues are quite insensible. When the operation is finished, the process is reversed, and the tissues brought back to normal. It is claimed by Dr. Charles Jubel, head of the Paris school of dentistry, that the method is entirely successful, and has none of the after-effects of opiates or narcotics. Somebody try this out and report results.

Dr. St. Louis Estes, of the International Institute of Applied Psychology, Chicago, recently told members of the American Academy of Dental Science, Trenton, N. J., that if a man carries a bald pate around with him in middle-life it is his own fault, a fault that can be promptly and satisfactorily corrected by the adoption of a diet of raw foods exclusively. And Dr. Estes carries around with him a living example in his own case. Five years ago he was bald, and was headed for the cemetery. Today he is active, vigorous, "young," and has an abundant crop of bushy hair. So much for so much. It is my own opinion that eating and drinking are the cause and the source of just about every human ill and of every good as well. Things are marching pretty fast along these lines just now; and I'm doing a little of the marching myself.

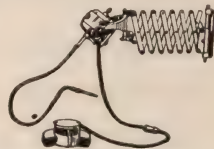
Life and death are matters of the correct or incorrect feeding of the cells. Human tissues have been and are being kept alive indefinitely in the laboratory, and equally good results may be accomplished in the body. Get this thing straight. One hundred and fifty years should be the average normal life of man. If you live less than that it is because you have been and are digging your grave with your teeth. If some enemy of the human race, seeking its extinction, had invented the modern conventional dietary, he couldn't well have done worse.

A very interesting and instructive report of the activities of the Flint Clinic has been sent to me by the director, Dr. W. R. Davis. It will be published in an early number. It contains much helpful material that may be useful to others.

Forsyth Institute, Boston, now treats around 500 cases per day. Similar clinics are to be established in other large cities.

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A colored lady waited patiently to see the dentist one balmy April Monday morning; and on the arrival of the dentist promptly started a discussion about some ill-fitting plates which the upper plate showed a number of teeth missing, one of the absent members being a gold tooth. She insisted on a gold tooth to appear in the new plates. The dentist suggested if she really wished a gold tooth, wouldn't it be better to have the left lateral rather than the left cuspid? She at once was in favor of this suggestion by saying "She then wouldn't have to open her mouth so wide to show her gold tooth as she did before."

Jackson, Mich.

The First District Dental Society at Detroit, Michigan, at a recent session, passed the following resolution discrediting as unethical the practice of members of the profession in giving or accepting money in payment for services as essayists or clinicians, as follows:

Resolved, That the First District Dental Society of Michigan, shall hereafter consider the payment of fees for the imparting of scientific knowledge as contrary to our professional ethics, and not in keeping with the high ideals we endeavor to maintain.

A brilliant red Buick car in a garage undergoing repairs, an "empty" but suspicious trunk, an empty office bearing a "For Rent" sign, all figure in the somewhat mysterious movements of one Dr. R. B. Gillars, an alleged painless dentist, who recently disappeared from Chillicothe, Ohio, under circumstances said to be very painful to a large number of creditors and not a few patients whose work is more or less paid for and by no means finished. Well, there's one born every minute!

I am glad to record the fact that Dr. J. K. Cunningham, of Princeton, Ind., has been exonerated of all blame in the shooting of Paul A. Stockel, self-confessed dental burglar, who died February 19, as the result of the wound. A few more such cases will make dental burglary somewhat less attractive as an indoor sport.

H. D. Justi & Son, 1301 Arch Street, Philadelphia, are distributing a very interesting little book bearing the title "How Artificial Teeth Are Made," which every dentist should have and study. If your copy has not reached you, a request to the address given above will bring a copy promptly.

Dentists may now buy grain alcohol for non-beverage purposes, to the amount of two gallons per year. Just about enough to satisfy that "all-gone feeling."

Any readers of this section of THE DENTAL SUMMARY who are interested in oral hygiene work are invited to write to me asking for interesting and helpful material, such as clippings, news, etc., relating to oral sanitation in the public schools. I usually am well supplied, and will be glad to be helpful.

Brooklyn, N. Y., is said to be infested with a strongly organized ring or clique of fake dentists, who are mulcting the public in all of the many ways open to unprincipled money-grabbers. Authorities are doing what they can to suppress the practice.

The following dental colleges show enrollment as stated: New York, 753; Pittsburgh, 661; Pennsylvania, 597; North Pacific, 576; Marquette, 558; Northwestern, 539. There is also reported an unusually heavy enrollment at all other colleges.

The Illinois State Dental Association is now credited with being the largest dental organization in the world.

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Died April 12, 1922.

with its biased distortions, nor in the ranks of the ultra-conservative with its deadening reaction. A real student, a real philosopher, a real practical dentist who stands square upon both feet and grows tall enough to serve all mankind, rich or poor, does not belong to either rank necessarily, as both ranks are working out the general rules and laws of progress. So I say that no idea in all the range of the human mind, in all of its excursions and ramifications is so imperative, so necessary to the eradication of the many little essences of hatred, bitterness, conflict, confusion and struggle as the idea of cooperation.

Now of course, there must be individual thinking, and there is pleasure in thinking; questioning and doubt have their rewards in the mind, and can also have their liberty and exercise and reward right here within our own circle. But don't forget that the thing we call efficiency is reserved for the profession or organization that can bunch its total energy into a clear belief and hurl itself solidly at a hesitating medical profession and a hesitating world.

In conclusion, I hope that the day is not far distant that when we are counselled by our patients on questions too big for *I*, we may have the privilege, intelligence and security of saying, *WE*.

I believe in organized labor as I believe in organized capital, but no man is fit to take part in either organization unless his first loyalty is due to the organization which includes all of us—to the Union of all these states—to the American nation as a whole. —Theodore Roosevelt

THE PROPHYLACTIC VALUE OF NITROUS OXID-OXYGEN IN REMOVAL OF DISEASED TEETH TO AVOID SYSTEMIC REACTIONS*

BY B. H. HARMS, D.D.S., OMAHA, NEBRASKA

ALTHOUGH THE PREVENTION of auto-inoculation during the removal of diseased teeth is something to be greatly desired, many years may pass before this goal is achieved in routine practice. In the meanwhile, the practitioners' time will have to be devoted to the prophylaxis of these conditions by such means as he has already at hand.

Even now, as in the past, anesthetics, local or general, are being considered only as means to an end, without due appreciation of their physiological and pathological action, immediate or remote, upon the various structures of the body.

In view of this fact, I am offering for your consideration, my comparative clinical experience in the removal of diseased teeth under general nitrous oxid-oxygen anesthesia and under Novocain local and block analgesia.

Briefly, the result of my clinical experience has been, that when I use a local anesthetic for the removal of one or more infected teeth, the patient gets a more or less violent reaction or exacerbation of the existing infectious systemic symptoms, whereas, when using N_2O and O as the anesthetic, such reactions or exacerbations have been absent, or slight, even though a larger number of teeth have been removed, and the surgical technic of the operation in either instance has been the same. On the one hand, auto-inoculation from the extraction of one diseased tooth under local analgesia has been violent enough to place a seemingly strong, robust patient in bed in the hospital, while, on the contrary, I have taken a bedridden patient out of bed in a hospital and under nitrous oxid-oxygen anesthesia have removed all of the teeth (sometimes twenty, or more) from the mouth with a great amount of root-end and peridental pathology presenting without enough reaction or exacerbation to be noticeable. Having carried out this procedure in many patients, and checked up results with hospital records of these cases, it certainly seems that the choice of anesthetics in the extraction of diseased teeth is entitled to more consideration than it has been given in the past.

In order to clarify my contention that local anesthetics are causative factors in precipitating the mentioned auto-inoculation, with their violent reactions or exacerbations, it will be necessary for me to refer rather extensively to the work of McConnell, Rosenow, and others, who have delved so deeply into the pathology, bacteriology, and therapy of focal

*Read before the Section on Anesthesia for Oral Surgery and Dentistry of the Mid-Western Association of Anesthetists, during the Organization Meeting at Kansas City, Mo., October 24-28, 1921.

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XLII

JUNE, 1922

No. 6

SOME INTERESTING TENDENCIES IN ROOT CANAL FILLING*

BY EDGAR D. COOLIDGE, D.D.S., CHICAGO, ILL.

INTRODUCTION

I FEEL it an honor to be asked to read a paper on root canal filling in this state. I respect and revere the memory of John Callahan as much as any man in the profession. He worked so faithfully and so cheerfully, and was always so willing to give of his information; he stuck to it when others were not interested, and stayed with it through the time when others were interested in it, through the time when they lost interest in it, and until they came back to be interested in it. It was his work, I believe, as much as the work of any other man, if not more, that has put root canal work where it is today.

This subject is one about which it is very difficult to say definite things. We are dealing with tissue. We are dealing with conditions that seem to vary under the same circumstances. We have no way of interpreting the reactions that will take place, even though we use the same drugs in the same way under what we think are the same conditions. We have no way to tell what the results are except by taking radiograms, and by this means we are not always able to determine.

There are many things in the treatment of root canals today that we are guessing at. If we can ever get this subject down to a definite science, it will be by such faithful and continuous and persistent work as Dr. Callahan gave us in his lifetime.

I have changed the subject of my paper by one word. I thought it was better to say "tendency" instead of "results." These are results, but results in this kind of work are only tendencies. It takes a long time to determine what the result will be. We may think we have one thing today, and find it is another tomorrow.

One of the most exacting demands of dentistry today is to properly diagnose diseased conditions of the mouth and teeth and to understand their relation to general health. Another equally difficult problem is to distinguish between those teeth which may be safely retained and those which will

*An illustrated lecture before the Ohio State Dental Society, Dec., 1921.

not respond to treatment. The information which has emanated from the centers of investigation on this subject has had two effects upon dentistry. One effect is seen in the greatly improved methods of pulp treatment and the placing of this branch of dentistry in the class of minor surgery. The other effect is seen in the exaggerated interpretation of the information which results in the extraction of all pulpless teeth in the desire to be on the safe side of the question. The dental supply dealers state that there is considerably less demand for root canal equipment today than there was five years ago. In some instances this is a good thing for it is probably a lesser evil to extract a useful tooth than to improperly treat diseased conditions and

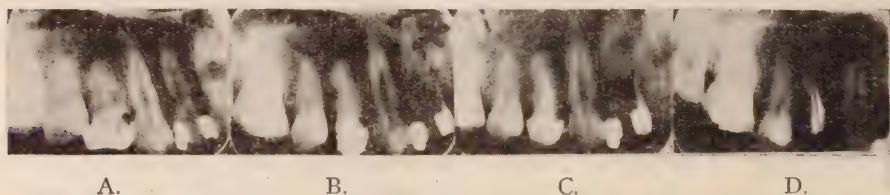


Fig. 1.—Case from Clinic, University of Illinois, Dept. of Therapeutics. (a) Pulp exposed by caries. Immediate pulp removal by cocaine pressure anesthesia with careful aseptic methods. (b) Measurement wires in place. Inaccessible canals. (c) Root canals filled far as possible. Notice condition of periapical tissue. (d) Eight months later, positive area of periapical absorption although canals were inaccessible in apical third.

imperfectly fill root canals. However, to extract useful teeth that can and should be saved is an injustice to the public that should be and is becoming severely criticised. On the other hand the effect of diseased teeth upon general health is so far-reaching that much emphasis should be placed upon the importance of removing or correcting such conditions. The dentist is placed in a very difficult position and must make a very careful diagnosis of each case. To avoid pulp removal where healthy conditions exist is a most important consideration but there are cases of hyperemia and inflammation or accidental exposure constantly presenting for treatment which must be taken care of. Useful teeth should not be sacrificed when it becomes necessary to remove the pulp. These teeth require pulp treatment and canal filling and this service should be given in such a way as to prevent future periapical disturbance. Frequently the requirements of large artificial restorations and crowns or attachments for bridges and partial dentures are so severe that a hypersensitive condition results, or even the death of the pulp. Many such cases would be less disastrous to the patient's health and much more comfortable if the pulp had been removed and the root canal properly filled before such construction was begun.

TEETH AND HEALTH

Dentistry has been dealing with teeth rather than with health. The field of dentistry today is no longer confined to the realm of teeth, nor even to the mouth, for there is an intimate relation between the teeth, the gingivae, the periapical tissue and the general health of the individual. In deter-

mining the procedure in every case the question must be considered, "what relation has this operation to the health and comfort of the patient." The same recommendation cannot be given in all cases and no set rule can be made for determining what teeth should be retained and what ones eliminated. The general health of the patient must always be a basis from which the plan of operation is constructed. More exacting treatment should be given where vitality has been lowered and general health affected by absorption of infectious and toxic products. The condition of the tissue surrounding the tooth itself is the next of importance. Where diseased conditions of this tissue can be corrected by treatment and eliminated as a source of

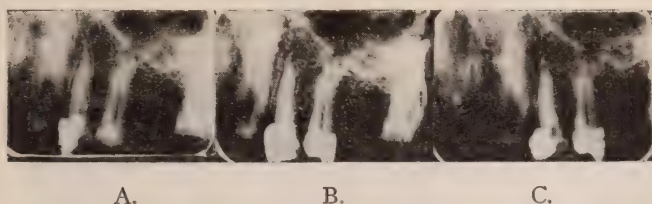


Fig. 2.—Case from Clinic, University of Illinois, Dept. of Therapeutics. (a) Pulp exposed by caries. Cavity excavated and oil of cloves sealed over exposed pulp for two days. Pulp then removed by cocain pressure anesthesia. ((b) Canal filled. (c) Eighteen months later. Notice healthy periapical tissue as compared to Fig. 1, (d), where no antiseptic was sealed in cavity before pulp removal.

infection such teeth should be saved. The easier method of extraction should be condemned. The age of the patient is an important factor in the diagnosis. There are greater chances of a response to treatment in the young patient than in more advanced ages. Since the reconstruction of the masticating organs so that they can function properly is so important in its relation to health there should be a very careful consideration of the needs of these requirements in the examination and plan of operation in each case. The loss of molar teeth, and especially all molars on one side of the arch, is far more serious than many seem to consider it. To cause a young patient to go through life with no molar teeth or with an artificial denture may do more harm to the health of the patient than would the teeth which were extracted.

CLASSIFICATION OF PULPS AND PERIAPICAL TISSUE

Every case of canal treatment is radiographed and classified before the operation is begun so as to have a complete record of the case. The classification followed is simple to permit the grouping of as many cases as possible into a few groups. These groups of cases are recorded and filed away and as subsequent examinations occur the record of each case is added to, so that it is of increasing value for future reference. I follow the classification suggested by Dr. Arthur D. Black (*DENTAL SUMMARY*, October, 1919), with a few changes in the original classification to satisfy my requirements. This classification is only used where pulp treatment is contemplated and

then every treatment is recorded as part of the history of the case.

Classification of the Pulp and Periapical Tissue for Pulp Case History:

1. Dental Pulp

1. Normal
2. Exposed by caries
3. Hyperemia or Inflammation
4. Gangrene

2. Periapical Tissue

1. Normal
2. Acute Abscess
3. Granuloma
4. Liquifaction Necrosis
5. Infection Cyst.

IMPORTANCE OF ACCURATE RECORDS

It is very essential that accurate records be kept as case histories of the condition of every pulp and of the treatment given each case in order to arrive at any definite conclusion regarding the cause of periapical disturbances. It is impossible to state at the present time what is the cause of so



A.

B.

C.

D.

Fig. 3.—Case from Clinic, University of Illinois, Dept. of Therapeutics. (a) Pulp exposed by caries and surface suppuration had begun although very sensitive. Phenol Compound (Buckley) sealed over exposed pulp for two days. Measurement wires in place after pulp removal by cocain pressure anesthesia. (b) Canal filled. (c) Six months later. (d) Eighteen months after filling. Condition of periapical tissue healthy although canals are overfilled. Sealing of antiseptic dressing over exposed pulp before pulp removal proved to be preventive treatment against periapical infection.

many involved or so called infected root apices. Most records of the past are of little value as they have been altogether too incomplete and if preserved at all are spread over ledger records and are not of easy access. Very little reference has been made to these records and they will not help us much at this time. How many operators could give an exact account of the number of pulps removed by pressure anesthesia or how many dead pulps or abscesses have been treated in the last five years. Some may estimate the number but I fear too few could tell exactly. In examining radiograms of previous root canal fillings which come into one's office there is no history to which reference can be made and no way to determine the cause of periapical disturbances which are shown by the radiograms. In the work being done now it will be possible to discover some of our mistakes and assure ourselves of more of the possibilities in root canal filling where a complete record is kept of each pulp treated. The record we keep of the case in-

cludes: the diagnosis; the method of pulp removal; the drugs used at each sitting, for this information will be of inestimable value after a few years; the method of sealing the tooth, whether by cement or gutta percha, and the material used for filling the canal. Our records date back far enough now so that we can begin to compare the results of the various methods of pulp removal and drug treatment.

PULP TREATMENT

For many years I have had a prejudice against the use of arsenic as a means of devitalizing the pulp. I have no record to substantiate such a feeling but have tried to avoid the use of any drug in treating root canals that would injure the periapical tissue should it get through the apical foramen. I have rather favored the use of cocain pressure anesthesia because of its simplicity and the satisfaction obtained by its use. At various times I have

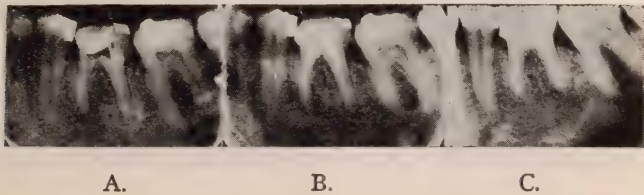


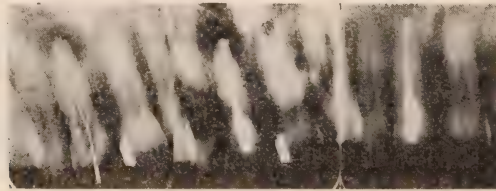
Fig. 4.—Bone Repair. (a) Case presented with imperfect canal filling and periapical absorption around each root. Canal cleaned and treated with 5% dichloramin T four times. Measurement wires in place. (b) Canals filled. Repair under way. (c) One year later, showing repair.

been surprised and annoyed by the appearance of some periapical disturbance around some of the root apices where cocain had been used. This change in the tissue sometimes is evident by the time the root canal is filled but not usually till a later time. In some of these cases I have been at a loss to know why these conditions should appear, while in others I realized certain traumatic injuries might be responsible.

In the department of Therapeutics at the College of Dentistry of the University of Illinois we have kept close record of these cases for the past three years. The work has been in the care of my associate, Dr. J. R. Blayney, who has supervised every case and given very careful attention to both the operation and the record of the case history. The students have done all of the operations in the infirmary in the regular daily methods of conducting their work. The case histories of pressure anesthesia were placed in two groups. Those where the pulps were exposed by caries and those where normal pulps were removed. We are finding that the periapical tissue disturbances are much more frequent about those cases where the pulps were exposed by caries than in the other cases. The records show the treatment given and in those cases where an antiseptic was sealed over the pulp for a day or more the involved areas are rarely ever found.

These periapical disturbances which we find range from a very insignificant line, or broadening of the normal translucent area at the

apical region, to small areas of bone absorption. This does not mean that these teeth are all diseased but it does mean that the tissue about their roots has undergone a change which is undesirable and unnecessary. We are conducting a series of experiments in the research department to determine the amount of injury which might be caused by forcing a sterile solution of cocain through the foramen of the root into the periapical tissue. Bastedo states in his text book on *Materia Medica-Pharmacology and Therapeutics* that "Cocain is a general protoplasmic poison, capable of irritating and destroying cells, or of stopping the motion of leukocytes, amebae and ciliated cells. Solutions above 5 per cent in strength injected hypodermically may result in the death of tissue, which shows either as a necrotic area of the skin or as a sterile abscess." The solution which we have used in pressure



A.

B.

C.

Fig. 5.—Bone Repair. (a) Case presented with imperfect canal filling and periapical absorption. Canal cleaned and treated with Tincture of Iodin and Beechwood Creosote. (b) Canal filled and repair under way. (c) Two years later showing healthy condition of periapical tissue.

anesthesia is many times stronger than 5 per cent and it is possible that this may have something to do with the disturbance in the periapical tissue.

We have also found a larger percent of cases which are over filled showing evidence of tissue change than where the roots are slightly under filled. It is quite possible that the amount of traumatism produced by the presence of this foreign body, namely the chloropercha or gutta percha, has caused a pressure atrophy in the periapical tissue in some of these cases. It is also noticeable that a much smaller per cent of these tissue changes occur where the foramen is inaccessible. This fact if substantiated by further evidence will show that the danger of trauma in overfilling a canal is greater than the danger of leaving a small portion of the canal unfilled providing the work has been done aseptically. Dr. F. B. Noyes, in his paper before the Illinois State Dental Society 1920, *Journal N. D. A.* Feb. 1921 stated that the theory of the multiple foramina has been over worked and that it is of little consequence from a clinical standpoint how many foramina a root has since all foramina are openings through cementum to which fiber bundles of the peridental membrane are attached. Injury to this tissue is very undesirable. In the technic of cleaning and filling root canals it should always be kept in mind that injuries may be caused by broaches, drugs or excess filling material even though they are sterile. No attempt should be

made to pass the constriction found at the junction of the dentin and cementum where the periapical tissue is healthy, and acids or other irritating drugs should be avoided or used with great care to prevent any injury to the healthy fibers of peridental membrane lining the cementum from the dento-cemental junction to the end of the root. Canals slightly underfilled or inaccessible canals in cases where the periapical tissue is normal seem to be protected and usually remain normal. This is not a conclusion but it seems to be the tendency in our findings.

The work in my private practice corresponds to that of the clinic, although not so much tissue change is found. I have found in checking up the cases of pressure anesthesia I have had during the past five years, that there are a number which were exposed by caries that show some tissue

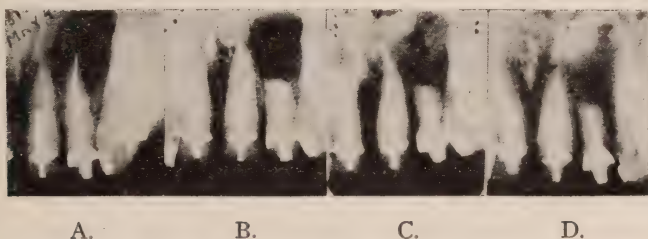


Fig. 6.—Bone Repair. (a) Large cyst. Canal filled before resection. (b) Resection of root and cavity curetted. (c) Six months later. (d) Two years after resection.

changes at the root end. These are mostly very slight areas which may be only a thickening of the soft tissue at the apex. *I am fully convinced that pressure anesthesia should not be used where carious dentin or exposure by caries presents.* However, the sealing of an antiseptic in the tooth for a day, has evidence which may prove to be a safe procedure. In my case, over filling does not seem to affect the result as much as in the clinic cases, but most of the excess cases of the clinic had more gutta percha through the foramen than mine. As many of my cases, where caries presented and were followed with over fillings of the canal, show healthy periapical tissue as do the cases of caries with perfect filling, but I have only found one case under-filled showing any trouble. This does not justify over filling, but it seems to lessen the importance of over filling as a cause of tissue change.

TREATMENT OF DEAD PULPS AND PULPLESS TEETH

I wish to add a few words regarding cases which present with small areas of tissue change which are usually called infected or abscessed teeth. Many of these cases respond to treatment. Noyes states in his report, that as infection travels through the foramen, it passes out between the fibers of the peridental membrane, following the course of the lymphatics. "As the inflammatory reactions become extensive, the surface of the cementum is the last area upon which these tissues are destroyed and it seems to me that is one of the items of hope in our problem."

He illustrated that cleverly by saying that if the root canal were large

enough so that we could imagine ourselves inside of it, and crawling through it, and we crawled out through that constriction at the junction of the cementum with the dentine, we would immediately become entangled and obstructed by a mass of wires and ropes stretched across that opening. The fibres of the peridental membrane enter the cemental opening of the root canal. And the success of the curing of any disturbance in the periapical tissue depends largely upon whether that attachment to the cementum is destroyed and that cementum is infected. If the cementum is not infected, if it has live tissue covering it, Nature will take care of a disturbance as an infection when the source is removed, and new tissue will be formed; but if the cementum covering that surface of the root becomes infected, the cemento-blast is destroyed, and no new cementum can be deposited. Consequently no fibres can be attached to the tooth and permanent healing is impossible.

In treating these cases I have been using with great satisfaction a 5 per cent solution of dichloramin T. This solution must be prepared by dissolving this powder in a chlorinated liquid, chlorocosan, and should be kept in an amber bottle. The solution should be discarded when it becomes cloudy. Where tissue reaction is desired I use equal parts of tincture of iodine and beechwood creosote. An infected canal must be thoroughly disinfected before filling and these remedies will accomplish more than any others in use at the present time which will not injure the periapical tissue and those drugs which will injure this tissue should not be used.

In conclusion I wish to say that there can be no positive recommendations made at this time but that continued investigation and comparison of records is necessary. Every one must be equally exacting in the interpretation of radiographic findings to report and even then a person other than the one who performed the operation should check up the radiograms and classify the findings in order to make the basis of the reports as uniform as it is possible. I want some one else to check up my radiograms for me rather than to do it entirely myself, and then I know there will be no partiality shown. It is very easy for us to report on root canal fillings, and report them all good, but are we willing to let the other fellow look over our radiograms, and then report what he finds? I think that is the only way we can get at this question. Even then it is not positive, because there is always a variation in the interpretation of radiograms and a variation in the appearance of them. A radiographic finding is different in different pictures, but it is the only way I can see by which we will ever arrive at any conclusion, and the more faithfully and persistently we follow it, the sooner we will get results. We must depend on the records of the past if we wish to do better in the future.

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CORRECT RADIOGRAPHIC INTERPRETATION AND THE THOROUGH REMOVAL OF ORAL INFECTIOUS FOCI.*

BY FREDERICK F. MOLT, D.D.S., CHICAGO

IT IS a deplorable fact, omitting any comment upon the value of the scientific work accomplished by the organization, that the Research Institute of the National Dental Association, fathered with the ostensible purpose of adding to our scientific knowledge, should have been so quickly abandoned. When we consider the thousands of dentists in practice in our country, the comparatively small number who are doing more or less earnest work in connection with the Forsyth, Eastman, Mayo, Hooper and Johns Hopkins institutions, seems infinitesimal. The group is not perceptibly increased by the addition of those self-sacrificing workers who, in their thirst for knowledge, are devoting their time at their own expense to scientific investigation. If we are really to justify our existence as a profession and rise above an undeniably empirical plane, we must have, primarily, advanced scientific research; there is today no more crying need in our profession. In view of this, the cessation of this work under the auspices of the National Dental Association is a retrogressive step.

If one doubts that we are most of us at heart empiricists let him peruse current and past dental literature, culling the few grains of established fact from the chaff of opinion. Let him give ear to the "shop-talk" of a group of dentists when it turns from essentially mechanical subjects to indulge in medical theories and terminology. Granting that we can hardly expect to make scientific laboratory workers of older men little versed in such pursuits, we can at least begin to train younger men for such investigatory work, and to look about for an adequate means of financing research.

While it must also be admitted that the evident solution of many of our perplexing questions lies in prophylaxis and the spread of the oral hygiene propaganda, none of us will live to see that day when our mechanical, medical and surgical problems and decisions will not still be vital.

There are many of our profession with the medical training and degree from whom we have expected much and received little; many who speak with the voice of authority and yet add nothing to what we already know. Our medical brethren took us into their own field when they uncovered the present day accepted facts regarding focal infection and asked us to share in their problems and their curative efforts. Although in the first flush of our enthusiasm over this "recognition" of our profession, we plumed ourselves over our importance, talking learnedly the while of blood-counts, complement fixations, and the like, it was altogether too arduous an undertaking for many to revamp their entire methods of practice; so these

* Read before the Cleveland Dental Society, November 1921.

have remained reactionary stand-patters ignoring what established facts we have and bewildering us with a cross-fire of—opinion! Well may we acknowledge with Grieves, therefore, that we have enough to keep us busy in finding the solution of our own problems of pathology!

The one question above all others to which we can give no reply based on definite knowledge is “what of the pulpless tooth?”—the black beast figuratively and literally of our existence and about which we have more opinion and less fact than any other one thing. We may choose between the ultra-radical assertion that the mere fact of a tooth being pulpless condemns it instantler, and the ultra-conservative, 19th century opinion that no pulpless tooth need ever be sacrificed; between the contention on the one hand that every tooth without a vital pulp is septic and on the other that no matter what may occur inside the tooth, no matter how infiltrated it may become with putrescent material or how much periapical destruction may occur, the peripheral structure still remains living tissue. It is here that it would seem quite the sensible attitude to take that we should look farther than the mouth and be guided in the greatest measure by our patient’s physical condition; that we should not “let the trees obscure our view of the forest.”

Hubeny in a recent paper gives the medical viewpoint quite concisely when he says that we as dentists are assuming a greater responsibility than we are justified in doing when we attempt by an embalming process (we cannot call it other than that) to retain or restore an organ manifestly dead and septic. The fault, he contends, is palpably the patient’s since it is lack of care on his part that has brought him to this pass, so why, he asks, should we be keen to accept a burden fraught with such dangerous possibilities?

In tooth extraction, as a matter of course, we invariably have the patient on the side of conservation, unless he is ill enough to be desperate, but this should receive as little consideration from us as would a patient’s disinclination to undergo a needed major operation from the surgeon. If the patient’s health, present or future, demands extraction, *let it be done*.

There are always two factors to be considered in every case of existent or potential metastatic pathologic invasion:—the virulence of the infection and the resistance of the patient. So long as resistance is uppermost, of course, vital balance is maintained. Neither of these factors, however, may be predetermined, nor can we say in how short a space of time the balance may be overcome. Therefore, when we assume to dictate whether or not manifestly septic conditions should be ignored for tooth conservation, we are going beyond our field. This decision is undeniably the prerogative of the physician and we should wherever possible defer to him utterly. Such co-operation and collaboration is desirable and essential.

The physician on the other hand must look to the dentist for oral diagnosis and the dentist should be prepared to furnish him with definite

knowledge as to conditions. This presupposes his ability to do so—a supposition, unfortunately, not always justified by fact.

A diagnosis of oral conditions must be based primarily on an interpretable radiogram, a complete oral radiogram if possible in every case. The desirable radiogram is one produced without over- or under-exposure, properly developed, and without distortion. If any confusion arises over any area shown, this should be re-exposed to provide multiple views of the teeth or edentulous area in question.

In practically all cases a three to three and one-half inch penetration will provide a more interpretable product than the five to six inch so universally used. The radiogram obtained will be much "thinner" but more "contrasty" than that to which so many have become accustomed, but in it all evidences of radiolucence, no matter how slight the variation in density, may be observed. The milliamperage and time of exposure should be determined by experimentation (approximately twenty milliamperes being desirable) and the time varied according to the target distance. The McCormack distance technic may be used entirely or the usual type of exposure may be made for all but upper molars. Here the distance exposure is particularly desirable because only in this way may the relation of teeth and maxillary sinus be shown without the intervention of the malar shadow. The exposed film should develop to the desired texture in five minutes at 65° F.

Having procured a radiogram of interpretable texture the dentist should consider the possibility of confusing anatomic and pathologic deviations. He should have familiarized himself with the appearance in normal mouth radiograms of such structures as the anterior palatine foramen with its surrounding fossa, the median suture and the nasal fossae; the canine fossa; the maxillary sinus, which may be divided into two or three compartments by partial or complete septa or may through excessive pneumatization be extended down into edentulous areas between bicuspid and molars; the posterior palatine foramen with its frequently very deep fossa; all of these in the maxilla. He should recognize, as well, the shadow of the malar process and of the coronoid process of the mandible. In the mandible he should be able to point out the radiolucence of the incisive fossa or fossae; the mental foramen; the incisive and inferior dental canals; and the mylo-hyoid groove. This latter is all too frequently misinterpreted.

In pathologic deviations he should be able to designate the appearance of alveolitis; periodontitis; granuloma; abscess; cyst (inasmuch as these latter three so frequently are found to partake of the nature of each other in a great measure, it may not always be possible to differentiate absolutely between them); necrosis, osteo-sclerosis, pyorrhea, osteitis serrata, and osteo-genesis. He should mark evidences as well of hypo- or hyper-plasia and of rarefying or condensing osteitis in pyorrhea involvement.

This is interpretation, but *only* interpretation; it becomes a diagnosis when all possible facts in history and symptomatology are secured, a thor-

ough clinical observation made and all data thus obtained are reconciled and co-related. It is apparent that the "diagnosis" sent out by a radiographer is fallacious, therefore, and that the dentist himself should be consulted. With these conditions outlined, the absence or probable presence of infectious oral foci determined, and "doubtful" teeth marked, the time has arrived for consultation between dentist and physician. The teeth we should class as doubtful are those that are pulpless but radiographically negative. If it can be determined by questioning the patient or by reference to records of previous dental work that the pulp of such a tooth has been extirpated under aseptic conditions that tooth may surely be regarded with more complacency than one having a history of putrescent infiltration, acute or chronic periapical disturbance or what not, no matter how violent or odoriferous the "curative" treatment. Those teeth with a history of a filling in of pathologic areas are also open to question. It would help indeed if we could take some of these teeth out and examine them before expressing our opinion of their harmful potentialities!

Necessarily the matter of restoration enters in a great degree into our decision, as, for instance, the case of an otherwise perfect denture in which we would be reluctant to remove two or three "doubtful" teeth while in another case we would know that a more serviceable restoration might be made with all teeth extracted. Particularly are we confronted by a problem in a case of malformation in which the possibility of a satisfactory restoration is slight.

Having summed up all these factors let us present our case to the physician and only incidentally to the patient. If the health of the patient is precarious or if systemic conditions are present in which oral foci of infection may be an etiologic factor, necessarily our procedure should be more radical than if the patient were in apparently perfect health. If pathologic conditions are present that may be considered distinctly a menace and yet the patient's condition is such that it calls for no radical stand, we may either temporize with the cognizance of both physician and patient, and a distinct understanding that these teeth are on probation, or we may go about their elimination as a prophylactic measure. If on the other hand radiographic findings are negative and the physician finds no need for the elimination of teeth merely pulpless, considering the present day lack of definite scientific knowledge we may well assume a conservative attitude.

If we are called upon to do away with all oral sources of infection, it would seem the height of folly to consider that the simple extraction of teeth bearing over- or underlying granulomata, abscesses or cysts will achieve the desired result in even a fair proportion of cases. While it cannot be and is not denied that in many cases following such an extraction and the leaving of such an infectious mass *in situ*, the septic material is eventually absorbed or obliterated, just as in many cases regeneration of bone is achieved in periapical diseased areas after tooth treatment. Such a result manifestly depends upon the recuperative power of the patient. The many cases in

which, long after the infected area should be filled with regenerated bone, we find it filled with a residual infected mass is convincing proof of this. It has been accentuated that the possibilities of a given area of infection cannot be determined in advance nor can the amount of resistance that the host can offer. It is usually in cases in which, because of systemic invasion, the resisting power of the patient is apparently at a low ebb that we are called upon to extirpate the oral foci. How utterly illogical it is, therefore, to extract the teeth, which although acknowledged to be the primary factor in the disturbance *are not* the source of infectious dissemination, and leave the granulomata or abscesses which *are*, in the naive assumption that by some hypothetical means this probably already over-burdened vitality is able to eliminate the mass. No more logical is the catch-as-catch-can type of extraction with an indefinite attempted curettage, which not only does not extirpate the granuloma, but in fact by macerating and stirring up the infectious mass, opening new channels for dissemination of toxins, and, finally, sealing the socket with a blood clot really leaves the condition worse than it was originally and subjects the patient frequently to an overwhelming dosage of micro-organisms and their by-products.

The culturing of three thousand periapical masses—granulomata, abscesses and radicular cysts has shown practically no exception in the routine pathogenic findings and fails to justify the assumption that a granuloma may not be as infectious as an abscess or that a cyst is invariably sterile. Abscess is here used in the sense of a chronic condition become secondarily acute, not a beginning round-cell infiltration, and the cysts cultured were of the radicular type, usually containing caseated pus. The extensive cyst formations of other types are not considered from the viewpoint of infection so much as of bone destruction.

If, as we have been taught for so many years, tooth extraction is surgery, why should we not apply to it the principles of surgery instead of adhering to the methods in use in the hands of the blacksmith and the barber in the days antedating the birth of our profession? No surgeon attempts to operate without having in view, if possible, the part upon which he is to work, and our surgical judgment should enable us to select the cases in which the best interests of the patients require an open view of these areas as well. The operator *should* be able, moreover, to perform such an operation with all the technical skill and aseptic care that is necessary to achieve a complete surgical result.

The retraction of a muco-periosteal flap and the excision of sufficient—and only sufficient—overlying alveolar process to obtain access to and a view of the septic mass, the removal of which is called for, is the only way in many cases in which we may accomplish complete enucleation without maceration and its attendant harmful dissemination, and at the same time avoid invading adjacent delicate structures, destroying essential bone formation and with other undesirable sequelae.

By far the larger portion of granulomata, cysts and abscesses are found

to be walled off by a sclerotic bony wall—evidently nature's effort to isolate the infection. Although it is frequently claimed that this sequestrates the infection, on the contrary this bone limiting wall is found to be exceedingly vascular, making possible a widespread dissemination of infection. This hard, bony wall if present should not be disturbed unless radiographic evidence points to previous infection and regeneration with evidences of residual infection.

It is disappointing to hear the characterization of this type of operation as "meddlesome surgery," "removing all the bone from clavicle to eyebrow," "surgery for revenue only," etc., by men who know little or nothing about the subject, who probably have never witnessed such an operation or whose selfish interests dictate their attitude. These selfsame men will pass by a case of "wing-shot" extraction that leaves a lacerated bone-destroyed area that looks like a shell-hole, without comment. To see such an operation properly performed is invariably to become a convert.

The open-view operation for a single area (one, two or more adjacent teeth) calls for a single diagonal incision to the mesial of the infected area, and either a "nicking" or less extensive incision or a diagonal to the distal. The object of the diagonal incisions is to avoid disturbing the blood supply, the flap being wider at its base. The muco-periosteal flap is carefully raised and retracted. With chisels sufficient overlying process is removed to expose the tooth and infectious mass and the tooth or root then tipped to the buccal or labial. With the blade type of curet gently inserted at the margin of the granuloma the mass is gradually loosened from its numerous attachments and lifted out intact. The bony socket may now be dried and painted with iodine, alcohol or phenol, making assurance doubly sure. This may be followed by only sufficient scraping to stimulate hemorrhage in order to form a blood clot. Any prominent points or margins of processes should be trimmed to bring about a comfortable result. Septa between the teeth and between roots should be left intact to act as a matrix for regenerating bone. The retracted tissue flap is then laid in position and sutured, care being taken to avoid any tension. Bone formation will retain the shape of the flap as replaced so any intermediate sutures should be placed over septa if possible.

There is surely nothing novel about this procedure. Competent oral surgeons have for years used just such technic for the extirpation of cysts and of necrotic bone areas. Why, therefore, should the application of such surgical principles to the elimination of as admittedly harmful masses give rise to such violently adverse criticism? "Consistency, thou art a jewel," indeed!

The operation for alveolotomy in preparation for dentures means the use of this identical technic on a larger scale, taking care, in addition to obliterating septic masses, to eliminate under-cuts and over-large tuberosities, and leave the ridge with the proper amount of reduction so that the required ridge-lap of denture teeth may be obtained. Every precaution should be

observed to avoid flattening the ridge by causing tension upon the buccal or labial muscle fibres. It is better to permit the flaps to remain two millimeters apart than to attempt complete co-aptation, and better by far to permit a separation of five or ten millimeters than to pull the muscles in suturing. It is even possible if desired to raise the buccal and labial fold to a degree, this being of advantage in low arches.

No reduction of the lingual plate of process is made other than the smoothing down of the spines at the septa; except in cases where because of malformation extensive cutting is called for to obtain an esthetic result.

Suturing may be of the continuous or interrupted type, and no more sutures should be used than are necessary to hold the flaps in position. Care should be taken, as before mentioned, to suture over septa in order to avoid indentations. Meticulous care and surgical asepsis should be observed throughout.

It is worthy of passing comment that, while we have had scathing condemnation of such procedure from various sources, at the recent joint meeting of the national organizations of the denture prosthetists and the exodontists, devoted to a consideration of desirable methods of mouth preparation, the prosthetic men were a unit in endorsing the alveolotomy operation. The only censure was directed at *over-operation*, which is conceded without question—surgical judgment, again! Consultation between the exodontist and prosthetist should precede any attempt at mouth preparation and, if possible, models should be made and studied.

If the need of the so-called surgical removal of teeth in one part of the mouth may be accentuated more than in others, it is in relation to the maxillary sinus in the maxilla and the inferior dental canal in the mandible. Novitsky as early as 1914 pointed out the apparent symptoms produced by what he called "antrum and inferior dental canal drain." These symptoms are, briefly, frontal and parietal headaches and neuralgias, eye and ear disturbances in antrum drain; and occipital headaches, "third division" neuralgia, recurrent peritonsillar abscess, trismus in the mandibular articulation, and buzzing and ringing in the ears (tinnitus aurium) in the inferior dental canal disturbance.

The relation of adjacent infections to antrum disease cannot be too greatly stressed, for the communication between the maxillary sinus and the ethmoid cells, sphenoidal and frontal sinuses is so intimate that an infectious process once established may involve the entire paranasal tract. The difficulty of accomplishing a cure once such infection is established should cause us to consider carefully the possibilities from either leaving periapical infectious masses *in situ* or extending infection through careless operative procedure, such as opening the antrum with forceps, forcing up tooth roots, or, in attempted curettage, plunging both curet and infected tissue into the antrum.

The potentialities of inferior dental canal drainage while not as far-

reaching are equally vital. We have in both this type of case and those of antrum drain the possibilities of local as well as metastatic invasion.

Benedict has pointed out the possibility also of eye disturbances, notably iritis, originating from oral foci. The possible relation of oral infection and glaucoma while suspected is still to be definitely established.

Withal, the existence of foci of infection in and about the teeth with what evidence we have been given, cannot be denied. Although we were vehement in our expressions of indignation over Hunter's arraignment of "American Dentistry" in 1910, later studies by Billings, Rosenow and many others have proven definitely that all he averred was true. Unfortunately there are many in our profession whose methods of practice have not changed one iota in these many years and whose habits of thought have kept the same pace.

In conclusion we may summarize:

1. Scientific research is vitally needed to aid in the solution of our vexing problems, and should be encouraged in every possible way.

2. As a prerequisite for definite elimination of oral infectious foci, interpretable radiograms should be demanded, and these intelligently interpreted.

3. Decision as to extraction or retention of doubtful teeth should be based upon a consideration of radiographic interpretation, symptomatology, history and clinical findings, *together with* the opinion of the medical practitioner.

4. Definitely shown periapical areas of infection call for the extraction of teeth except in most favorable cases and then only with the assumption by the patient of the burden of responsibility.

5. Extraction of teeth bearing periapical infectious masses without curettage, or without adequate curettage does not eliminate the infectious focus.

6. Such residual areas of infection are autogenetically obliterated in only an uncertain proportion of cases. Those that remain are potentially as great a source of metastatic disturbance as in their previous condition.

7. The thorough elimination of such periapical lesions assuring a complete surgical result, may be accomplished by the open-view type of extraction in cases where indicated.

8. Contrary to statements often made, no undesirable sequelae may be expected to follow the *careful, intelligent* use of this method of procedure.

Since without doubt the solution of the pulpless tooth problem will come only with the prophylactic care that will prevent decay; since that millennial period is so far in the future that we must still continue to agitate this question; and since in the absence of definite scientifically determined facts, we must base our methods of procedure upon observation, by all means let our opinions as expressed be logical, progressive and unbiased, a credit to our professional traditions—not reactionary and retrogressive.

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RATIONALISM VS. RADICALISM*

BY F. R. HENSHAW, D.D.S., INDIANAPOLIS, INDIANA

LITTLE DID THE FATHERS of dentistry, Hayden, Harris, Parmelee, Brown and their confreres guess of the problems that the profession they were so generously endowing with their skill and learning, was to meet and puzzle over within less than a century after their day. When these men wrought, only those mechanical procedures incident to the restoration of lost tooth substance or dental members demanded their skill, and most wonderfully did they perform these operations with the limited armamentarium at their command.

The succeeding generations of dentists found their labors becoming more and more complicated, until at the present time we have arrived at a place where all the sciences must be brought to the aid of the man who aspires to give to his clients that finished product of service, which shall coordinate with the work of the physician, surgeon, internist and hygienist.

In arriving at our present state of practice we have undergone many spasms of radical thought, some of which were productive of much good as well as of much harm both to the profession and to the public. Always it has been the tendency of mankind, especially we of America, to be faddists. No one has ever propounded a new creed or cult with vigor and zeal, and such persons are always vigorous and zealous, without attracting followers who go even further than the originators intended or expected to go. Whether it be in religion, politics, temperance or science the result has always been the same; some radicals are always to be found who are not deterred by those natural inhibitions which are so essential to the maintenance of the balance of sanity and good judgment.

We wouldn't know what to do without them but sometimes we don't know what to do with them.

We are all faddists to a greater or lesser degree. This has been demonstrated many times in the profession of dentistry.

One of the early fads, beginning in the early 90's was the crown and bridge-work fad which spread like wildfire to every city, village and farm, until the gold-shell crown shone like a headlight at every turn. Here again the radical overplayed his hand, and because of the careless, inefficient and oftentimes dishonest methods of construction employed, finally brought this type of work into such disrepute that it called forth the much resented but highly-merited rebuke of Hunter, the English investigator, who brought the whole dental profession up standing by his startling and authentic statements. From that time a spirit of con-

*Read before the Indianapolis Dental Society, April, 1921.

servatism has consistently prevailed in the construction and application of crowns and bridges, that has done much to remove the just reason for criticism that before existed.

To be sure there are those who have gone to the other extreme in the past year or two, and utterly condemned and abandoned the fixed bridge in any form in favor of the so-called removable bridge, but there is already indication that there is a return of sentiment in favor of the rational use of both, as best indicated in the particular case, and that neither is a panacea for all ills. Certainly the day of the fourteen-tooth bridge is past, but just as certainly many penalties are to be paid for the removable bridge.

For many years prior to about 1903, dentists had constructed occasional porcelain inlays in well-selected cases, and had thereby made beautiful cosmetic restorations that commanded the admiration of all who saw them.

Suddenly, like a clarion call, came the porcelain fad. Every dentist in the profession suddenly became a porcelain expert over night and the literature of that day contains little else. The fad continued at fever heat until it began to dawn upon the profession, and the public as well, that the results were not as expected. Then came the ebb and like a tide going out it left the porcelain art stranded high and dry. Now it was not because of the lack of practicability of the porcelain inlay that this fad exploded, but purely and simply because of the lack of that fine technical training and experimentation that are absolutely essential to success with this material. This is borne out by the fact that the tenacious, rational porcelain workers who survived the crash, are today doing exactly the things that we all hoped and tried to do in the days of the porcelain rush.

Then the root-canal fad. With the advent of pressure anesthesia it became a very simple matter to painlessly destroy the pulps of teeth, and as that eliminated present pain in our immediate operations, everyone did it gladly and gleefully, secure in the belief that we could so perfectly fill those root canals as to preclude the possibility of future trouble.

Some of us went so far as never to place a crown on a tooth without first devitalizing, and at least one man had the reputation of never filling a tooth until he had first removed the pulp and filled the canal. All this covered a long period of time and tens of thousands of teeth were thus treated.

Then came the X-ray picture and the discovery of focal infection, and every good, conscientious operator was thrown into consternation by the findings reported by the pathologist and bacteriologist. No one could be sure of himself nor of his methods of practice, nor could he trust the advice of his neighbor and friend.

No more serious dilemma was ever encountered by any profession than this, for at once the radical began to demand the removal of every

tooth in which the pulp had been destroyed, and the medical profession, seeing in these focal infections a possible solution of many of their puzzling and obscure cases, added to the score by ordering their patients to have whole rows of teeth removed. There is not the slightest doubt that many afflictions of obscure origin have been cleared up by the removal of oral foci of infection, but also there is not the slightest doubt that thousands of teeth have been unnecessarily sacrificed without the slightest benefit to the patient. The best minds of the dental and medical professions are working on the solution of this grave and difficult problem, and until the evidence is all in and carefully weighed and sifted, it behooves us, as a profession, to keep our heads and maintain a conservative position in these matters not only for the sake of our profession, but for the sake of the public who become the ready victims of these wild impulses.

The radiograph has not proven to be an unmixed blessing. In no other field is there greater reason for careful study and wide information and even in the most skillful hands there is chance for grievous error.

To my mind the most accomplished dental radiographer in America is our own Dr. Howard R. Raper who has devoted the principal part of his life to this work.

From the very beginning Dr. Raper has recognized the shortcomings of the dental radiograph, and in all his writings he has counseled a conservative interpretation and thoughtful diagnosis. The principal danger arising from the use of the dental radiograph lies in the half-baked diagnosis that is so frequently rendered upon the radiograph alone, without due and proper consideration of all other co-related physical signs and symptoms.

The most important need for consultation with the physician and internist arises in consideration of the dental radiograph as a diagnostic agent, for without a definite knowledge of the general physical condition of the patient the value of the dental radiograph becomes greatly depreciated.

Perhaps no wider divergence of opinion exists than in the diagnosis of so-called pyorrhea, or to use the term invented by the American Society of Periodontists, periodontoclasia; yet there can hardly be justification in pronouncing cases of simple gingivitis that can be cleared up by the usual well-known means of prophylaxis, as serious cases of pyorrhea. Yet just this thing is being done, to the consternation, fright and mental anguish of many victims who are entitled at least to a fair statement of their mouth conditions.

Within a short time the dental profession will receive a publication showing exact measurements and figures and adequate models, demonstrating that the practice recently in vogue of removing great masses of the alveolar border by the operation known as alveolectomy in cases of extensive extraction, leaves the mouth in such a deformed condition as to utterly preclude the best and most proper scientific prosthetic restora-

tion. This has been known as a radical operation and has much to commend it in the rapidity with which the tissues heal, but it will not stand the test of being to the best interest of the patient in the long run, and needs the gentle hand of the conservative to check it and relieve it of its serious objections.

In dental education of the public there have been great strides, but fortunately it has been largely along safe and sane channels and by men who have had the breadth of vision to put the facts in such simple form that the public has begun to appreciate the great work that is being done by the dental profession.

No profession has been more generous and unselfish in its treatment of the cause of the children, and at all times the heartiest cooperation has been manifested in all of the public health movements, so that today we stand shoulder to shoulder with our medical brethren in helping to build up a better and stronger race.

In the dental colleges the courses have been so standardized of recent years, that no just cause for complaint against any of the recognized schools can be said to exist at the present time. The advance from a three to a four-year course has brought about a higher development of the student and has made of him a more finished product. In spite of the fact that the four-year course is just now giving us its first finished product, there has been a very great effort on the part of some of the more radical leaders to force all schools into a requirement of five years beginning in 1921, and six years beginning in 1925.

Whatever virtue there may be in this demand is more than offset by the fact that if all the colleges in America had twice their present capacity, they would not be able in the period of the next ten years to produce enough dentists to supply the demand that has been created for dental service by the wide-spread Oral Hygiene campaign carried on for the past decade. The calmer, more conservative heads in the dental teaching profession have wisely counseled that we make haste slowly, and the schools, members of the National Association of Dental Faculties, will not inaugurate the additional year at the present time. It is felt that the needs of the public and of the dental profession will be best served by a slow and steady progress rather than by swift leaps and bounds.

Perhaps it may seem from what I have said that I feel that the profession is going to the demnition bow-wows, but I assure you that my feeling is quite the contrary. I feel that dentistry is on safe ground and in safe hands, and I do not wish to detract from the virtues of the men who are radical, for they are necessary to the progress that is being made, and without them we would probably stagnate, and so long as the great mass of us remain rational we shall profit and prosper.

Finally permit me to submit one further thought:

There is a class of men in our ranks who are ashamed of their profession and of their degree of Doctor of Dental Surgery, and who would,

if it were within their power, require that every man entering the practice of dentistry secure his training in a medical school and become a dental specialist with the degree of Doctor of Medicine. The experience of the dental profession in working out its own salvation as an independent profession has been productive of all the good that has grown up with us, and the contrary has proven to be the case in those countries where the Medical School has dominated; so of all the radicals that I hope to be protected from, that one most of all is he who is ashamed of his profession and who would like to put away the good and honorable degree of Doctor of Dental Surgery.

COOPERATION*

BY CHRISTIAN OLSEN, D.D.S., INDIANAPOLIS, IND.

THERE IS PERHAPS NO QUESTION, occupying the attention of the public today, a correct understanding of which is more essential to its welfare than that which is summed up in the word—Cooperation. It is therefore peculiarly desirable that at a time when most things are accomplished through organization, that we fully realize the necessity of cooperation, and also know how to cooperate.

"The trend of all forces now extant among men is toward unity; all lines of development are converging."

I take it that a dental society or any society for that matter has for its object the doing for the individual or enabling the individual to do for himself that which he could not do standing alone. This unmistakably infers that the society owes or has an obligation to the individual, and of course the individual has a duty to the society. When either one fails in its duty to the other, there results a sort of interruption in the progress, some humiliating failures, a hesitancy in the individual, a hesitating profession, and worst of all a confused and skeptic laity.

"Man is a dependent creature. If you examine any human greatness you will find it consists of a human spirit finding some person, organization or cause, and giving himself up to it." So with the individual dentist, he joins a dental society expecting by virtue of such relationship to become a greater and better individual dentist; *first*, by the society bringing him in touch with the new theories, new methods of treatment, new materials and technic; *second*, by discussions and deductions we may so arrange our thoughts as to acquire a common understanding of the new theories and methods, and through such a common understanding reach a majority conclusion. So that the individual will have the assurance, that in the new method he assumes in the practice of these new theories, he will have the backing of his associates.

Now as far as keeping the membership in touch with new things, I think the Indianapolis Dental Society has performed most admirably.

*Read before the Indianapolis Dental Society, 1921.

We certainly have not missed very much, if anything. But the society must be more than a center of induction; it also must be a center of deductions and conclusions. We must come to the realization that when a new theory or new method of treatment is presented to us by a brother dentist, that it is in its inductive state, and it is our duty to trim it and mold it until it at least does not conflict with our present state of the knowledge of truth. And not until a majority conclusion has been reached, should a new theory ever be practiced or imposed on the public.

It is of course very frequently impossible in the field of theories to verify what we think to be the truth by the process of reason. So when we come to an abstract truth we come to no easy task. It is possibly one of the most difficult challenges that it is possible for a man or organization to meet, and the average dentist should not try to meet it without some organized backing. One thing we at least never should do, and that is, the moment a certain man speaks, or the moment a certain institution makes a pronouncement, or the moment a certain quality of authority is imbedded into the personality that attempts to give the truth, just that moment is there a common acceptance, due to the fact that the *authority* is the predominant factor. I do not mean this as a reflection on the inductor of new theories. He is usually a leader and should be. He deserves all the honor and credit we can bestow upon him, and should be placed on the highest pedestal we have. I feel, in fact I know he is the most vital factor to progress in any profession. It is he who inducts the new things, it is he who points out the errors, which we needlessly allow to continue. Being a man of vital force and energy and positiveness which he usually is, he over-extends his imagination and over-emphasizes the truth in his enthusiastic effort in getting us to see things as he sees them. It is well and good that he possesses these qualities, for if he were not enthusiastic and positive he very likely would not attract attention. You know it is said that Billy Sunday attracts large crowds because he is positive; he is cocksure as to precisely what the Deity does and does not do. It also has been said that no individual, no scientist nor scientific manner—hesitating, questioning, or challenging its way toward truth, ever attracts or becomes popular. Just as this is true of the individual, is it also true of a profession or movement of any kind. A movement that attracts never hesitates, likewise a profession that hesitates never attracts or becomes popular. Take a movement like Christian Science, Roman Catholicism, Methodist Revivalists and political parties; the things that strike you most in all these is their unruffled certainty. They don't guess, surmise or suspect; they know. They are in unity on every issue before it is put out. So must we if we are to become as great a force for good as we might be. In that beautiful mental and moral talk given to us by Dr. M. M. House in presenting a plan of campaign for preventive dentistry, he suggested that every one

who goes out to speak in the interest of this preventive dentistry should memorize the same speech, so that the same thing would be said in Brown County as in Marion, in Steuben as in Green County. I doubt if the importance of this suggestion was noticed but just think what a force, power and influence such a method would immediately add to that movement.

Now, why could not this same principle be applied to many of our other activities? It is here where we can so well arrange our thoughts in orderly satisfaction, and reach a common understanding.

As Dr. Crane has said: "There is but one idea that explains everything, that gives to the earth's confusing events intelligence and a trend, and that idea is toward unity." Unity, men; that is a most powerful word when put into practice. Just think if we had unity in a near-standard of dentistry, unity in technic, unity in an organized method of determining the value of new medicinal remedies. Drs. Smith and Kennedy's papers of last January, have paved the way for such a possibility. I sincerely hope we will not allow that subject to get cold. I think a common understanding and majority agreement on technic among the common "garden dentists" as Dr. Henshaw calls them, would automatically raise the standard of dentistry and result in better and more uniform fees. For after all, Dr. Swank has said: "It is not a few outstanding figures that shine as it were, that determine the standard of our profession, it is the common average which numbers about 75% of our membership." When confusion enters the ranks of this common average there results a confused profession and a skeptical laity.

As an evidence that this is what is beginning to happen I wish to relate a few office experiences. The first one relates to medicine more than to dentistry, but it conveys a thought and point I wish to make. A lady told this to me in my office: She consulted a physician in general practice who advised her to see a certain gynecologist. After an examination he told her a major operation was necessary, but that she portrayed other evidences or sources of infection which he would rather have corrected first. So he recommended that she consult an exodontist and a nose and throat specialist, which she did. The exodontist radiographed her teeth and advised her to have five teeth extracted. She told him she would call later in regard to the extraction. Next she went to the nose and throat man. He told her that her ears were all right, her nose was all right, but her tonsils must come out. He sat down at his desk and began in this way: "Now I wish we could take them out right now, so you would not have the time to worry and stew about it. But of course that is impossible, so you go to the hospital tomorrow evening and Wednesday morning we will operate." She interrupted by saying: "Doctor, if that is necessary I would rather consult my brother-in-law first; he is a specialist along these lines in Toledo, Ohio." "Oh, is that so, and what is his name may I ask?" She mentioned his name. "Oh yes, I have heard of him. Now I

want to make this clear: You are being treated on the infectious theory of disease. Your tonsils are very follicular and are a possible source of infection and therefore should be removed. I mention this because your brother-in-law may not agree with me." That physician felt he was a member of a hesitating profession and almost in the form of an apology, explained away the force of his theory. She decided to treat with a neighborhood physician, has gained eight pounds and is feeling much better. He sent her to another exodontist who told her only two teeth needed to come out—note the "unity" in dentistry.

Another patient came to me with upper left cuspid, bicuspid and second bicuspid that had been treated and never were finished, because the dentist had been inducted into the army before he had time to do so. I suggested that she have them radiographed and also expressed a fear she would lose them. "There you go", she remarked. "I want to tell you, my neighbor had all her teeth extracted and she died. My mother-in-law had her teeth taken out; we thought she was getting better but she is worse than ever. My husband had five teeth extracted and his health has not improved. Now I am well and, listen, I want my teeth."

A few years ago a physician called me by 'phone in regard to a patient he wanted me to treat with emetin ipecac. He said he had made slides from pockets and found *amoeba buccalis* a plenty. He also said that this lady yielded very nicely to medicinal treatment and that we could expect a dandy result in this particular case. You all know what happened, and now we are confronted with another cure called Mercitan.

Gentlemen, I am pleading for an organized effort that will produce a condition that will make it possible for any one of us who so chooses, or desires to have the privilege of saying: We have decided so and so instead of "I think" or "I believe." "We" is so much more positive, powerful and assuring, than that hesitating, "I think." After all, civilization and progress is organization and it advances just in proportion as men learn to act in groups; and I say this with a full knowledge of the fact that only very recently a noted educator viewed with alarm the increased tendencies of organized effort and increase in the number of organizations, declaring that they produced a crowd-mindedness and mass-action without individual thought or effort. In the face of this however, most sociologists claim that due to too much individualism, this has become an age of immaturity of experiment, and vacillations; that it has invaded our economic life, our social life and professional life—and the dental profession has not escaped.

There is only one way in which we can become thoroughly equipped and trained to meet the vacillations and vicissitudes of the present day, and that is by an honest persistency in building up our intellectual fortification with such a definite understanding of the past, and such a careful, collective, cooperative and rational approach of the present, that we will not find ourselves either in the ranks of the ultra-radical

infections, besides quoting also from certain text books on pathology.

My clinical experiences, along these lines, have led me to believe that the interference of the local anesthetics on the circulation of the blood has more to do with the violent reaction or exacerbation, which follows the operation on infected areas, than any other factor. I do not believe that the small amount of local anesthetics used in these cases has enough toxicity to account for striking results so routinely noted.

It is a well known fact⁴ that there are numerous bodily activities which, altogether, furnish a greater or lesser degree of what is called immunity. All types of bacteria, after gaining entrance into the body, do not cause disturbances in the same way. Certain organisms produce typical soluble toxins, which, by their absorption, cause serious disease. Others will form no toxin while living, but after death will break down and set free various poisonous products, which, in turn, affect the invaded individual. Some bacteria, simply by sheer number, may so overwhelm the body defenses as to cause death.

As every infected person does not die, there must be some form of natural protection.

Many years ago, Metchnikoff came to the conclusion that the most important factor in the resistance to disease lay in the activity of certain cells of the blood, the polymorphonuclear leucocytes. Experience since then has shown that a very definite course of events takes place when infection by various organisms, particularly staphylococci and streptococci, occurs. At first the changes are chiefly in the blood vessels, but shortly it will be noticed that in the tissues where the bacteria lie many leucocytes will be present. Further examination will show that, in many instances, bacteria will be found in the body of the cells. On account of this property, such leucocytes are known as phagocytes, this term referring to their ability to take up foreign substances. This activity depends upon the power they possess of independent activity similar to that of the ameba.

For a long time it was believed that this ability to engulf invading organisms depended entirely upon the activities of the leucocytes. That, as a result of some vital power, known as positive chemotaxis, the phagocytes were attracted by the invader. This force, it would seem, could act even through the walls of the smaller blood vessels and cause the leucocytes to leave their normal surroundings. It was noted, however, that, although positive chemotaxis was the usual phenomena, there were times when the phagocytes seemed indifferent to certain bacteria. At one time it was thought that the leucocytes could take up dead bacteria only, and that was supposed to be the reason why organisms were not always found in the cell. It has been demonstrated many times that these phagocytes can take up living organisms and this explains some cases of secondary infections distant from the primary focus.

Certain animals⁵ are equally resistant to invasion by bacteria which can produce the most deadly disease in others; apparently because their

defensive phagocytes are so active that long before the bacteria can gain proper foothold they are seized upon and devoured.

The immunity is not absolute, however, for influences, like exposure to cold or heat, great fatigue, anesthetics, or other illnesses, may so break down the resistance that, after all, even the resistant animal succumbs to infection.

In all the ills produced by living invaders there exists a struggle for supremacy, even for existence, between the host and the parasite, in which the stronger prevails and in which defenses are developed not only by the host but by the invader as well. It is doubtless in this way that the bacteria accustom themselves, in passing from the body of one animal to that of another, to the action of the defensive reactions of the host, and thereby become more virulent.

For a time there were those who maintained that activity of the phagocytes constituted practically the whole defensive armament; while others, enthusiastic over their new discoveries, were just as sure that the neutralizing substances in the body fluids were all important; but now a reconciliation of these cellular and humoral doctrines has been effected, because it has been shown that they are very largely interdependent; phagocytosis depending upon the presence of auxiliary substances in the plasma, while, in turn, the leucocytes are important in producing other defensive fluid substances.

By means of phagocytosis in normal animals, as has been explained, bacteria and other parasites are taken up and digested by the phagocytes; but the help of the serum of the animal is most important, for without it the leucocytes engulf very few bacteria. Denye, Wright, and others, have shown that the serum contains opsonins which act on the bacteria and prepare them for attack by the leucocytes. Neufeld found that in the serum of animals, immunized by repeated introduction of certain bacteria, somewhat more resistant bodies (Bacterotropins) appear, which exercise the same function in making bacteria more approachable for the leucocytes. Aided by these substances, which bind themselves to the bacteria, or foreign cells, but do not affect the phagocytes, the wandering cells exhibit a greater phagocytic activity. Although the swallowing up of a bacterium does not necessarily kill it, it commonly does so, and at any rate removes it for the time being from the field of activity.

Doubtless a few bacteria brought thus into the most intimate relations with the body surfaces pass into the real interior; that is, into the tissues themselves, and are rapidly overcome and destroyed by phagocytic cells and by the destructive action of the blood and tissue fluids. Were it not for these defenses every one would quickly die from infection, since infection does occur with fatal results.

Members of the dental and medical professions have, for some few years, been taught that when a large number of diseased or infected teeth were to be removed, that it was, or is, dangerous to remove too many at one sitting. The theory being, that a too large number of bacteria, or too

great quantities of toxin, are set free in the invaded individual and that they may so rapidly overwhelm the body defenses as to cause death.

In my clinical experience such untoward results have not been the case when the choice of the anesthetic has been given due consideration. An imperilling or disastrous result may, to a large extent, if not entirely, be prevented by the proper selection and use of the anesthetic.

Irons says that the resistance³ of tissues themselves to the invading bacteria will also be a factor in determining whether the bacteria are quickly killed, or begin to grow. *Thus bruised tissues, and tissue previously injured by disease, may be less resistant than normal tissues, and may, owing to interferences with blood supply, offer conditions of oxygen tension different from normal tissue and, thereby, be a more favorable culture medium.* It seems quite reasonable to suppose that changed environment of bacteria, either in the body or in the culture tube, may lead to changes in their growth-requirements so that the same conditions under which they are barely able to survive and to produce low grade, almost symptomless lesions in the body, may later allow of greater growth and more serious lesion in the host, or, on the other hand, preclude any growth whatever.

In using local anesthetics for an operation on infected tissues where the anesthetic, to a greater or lesser extent, interferes with the circulation to the part to be operated on, either by infiltration or nerve-block, it produces the same condition artificially as exists in bruised tissue, *namely*, interference with the circulation and oxygen tension, and, *thereby*, lowered the resistance of that tissue to invading bacteria.

The only injections for blocking the branches of the fifth nerve, which do not interfere with the circulation of the blood in the parts of the mouth which are anesthetized, are the injections into the Gasserian ganglion and the sphenopalatine ganglion; all other injections, and especially those which are used in conjunction with infiltration, do interfere with the circulation to the parts which they anesthetize. True, a lower incisor could be anesthetized by blocking the inferior dental nerve on each side, which injection would in no way interfere with the circulation of the blood in the region of the lower incisor and would anesthetize the entire lower jaw with the exception of the buccal soft tissue region of the lower second and third molars, which is supplied by the long buccal nerve, and would also anesthetize the tongue; but to carry out a procedure such as this would be as uncalled for as a spinal anesthesia for a circumcision.

A bloodless field for the removal of teeth has been the aim of many operators and the condition very much desired by men who are using local anesthetics. While a bloodless field is a great help to an operator, it, on the other hand, is of great detriment of the patient, *first*, because it lowers the resistance of that tissue to invading pathogenic micro-organism, and, *second*, because it interferes with the normal coagulation time of the blood, which is nature's protection for any wound.

In a personal communication, Prof. Martin H. Fischer, who has so

brilliantly investigated the relation of deoxygenation and oedema to all conditions of systemic infection, writes that:

⁶"I know that the contentions of Dr. Harms are absolutely right, and I know this from personal experience with many ill patients and dental operators of unusual skill. Where local anesthetics are used I make the operator cut down the amount of adrenalin used to the minimum, and also the total amount of local anesthetic, trying to get him to inject the anesthetic where it will hit a nerve trunk. In other words, *produce the maximum of anesthesia with a minimum of local ischemia*. Of course, the nitrous oxid-oxygen anesthesia is the anesthetic of choice. The trouble is that the dental operators either do not know how to use it properly and do not get enough time, or else are bad operators from the start and so do not make a good job of an infected area in the briefer time of unconsciousness and insensibility to pain allowed them with nitrous oxid-oxygen. I, too, have seen bad systemic infections follow what I call these bungled mouth operations. They are very common, too, when operations are done badly on the tonsils, and here it is the same story. Unless local anesthetics are most carefully used and trauma is reduced to a minimum, there is much subsequent swelling of the injured part and great liability to infection.

"I do not know exactly, of course, why the infection occurs more easily in the injured tissues, but I am inclined, personally, to the view that the lack of oxygen in the swollen tissues, aided, of course, by the good culture ground of blood and bruised tissues, tells the whole story. *Nearly all the organisms that produce these changes are partial tension organisms, and to put them into a state of lowered oxygen tension is to give them the advantage of development over that of the host*. It is this principle that I have made use of so often in treating the general joint-muscle and other infections with streptococcus. I think that the immune body development business has very little to do with getting these patients well. All you have to do is to shrink their swollen tissues, let oxygen get at the bacteria and they die. What is the best, for instance, for the treatment of "rheumatism" is air, caffein and alkali, and wet dressing with magnesium sulphate, and what does all this mean, excepting systemic alkalinization, improvement in oxygen supply to the affected parts, and natural death of the infecting organisms? (Fischer)

"Teeth which have root-end pathology, such as granuloma, are more or less walled-off by nature from the surrounding tissue, and it is desirable that when these teeth are removed, as little auto-inoculation as possible should be given to the surrounding healthy tissue and the healthy tissue should not be placed in a position of lowered resistance.

"Regardless of what surgical technic is employed for the removal of these teeth and their granuloma, is it not reasonable to suppose that if the surrounding tissue is left in its highest state of immunity that the so-called reaction or exacerbation will be lessened?

"In those fatal cases which have been reported because of having too

many teeth removed at one sitting in only one case has any mention been made of the anesthetic used, and in that case the anesthetic was ether, and it was admitted that the patient had nephritis to begin with, which was, no doubt, aggravated by the ether anesthesia and not the removal of the infected teeth."

CONCLUSIONS

First. For the well-being of the patient anesthetics are not properly considered as to their physiological and pathological action.

Second. In the removal of diseased teeth it is desirable that none of the activity of the body defenses be limited or destroyed by the use of any drugs or anesthetics.

Third. The leucocytes are the body's first line of defense against invading micro-organism.

Fourth. Any agent which limits the action of the leucocytes, either by destroying them or preventing their passage to the invaded part by initial ischemia and secondary oedema, tends to lower the resistance of that tissue and the individual to the invading micro-organism.

Fifth. Any tissue which has had its normal circulation and oxygen tension interfered with has lost its normal degree of immunity.

Sixth. Local anesthetics initially interfere with the circulation, and oxygen tension, of the parts that they anesthetize, and, secondarily, cause oedema thereby increasing the susceptibility of the part to infection and auto-inoculation.

Seventh. General anesthetics, other than N_2O and O , lower the patient's resistance to infection.

Eighth. Fatal cases from the removal of infected teeth have not been properly reported.

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First National Bank Building.

PRESIDENT'S ADDRESS*

BY H. M. SEMANS, D.D.S., COLUMBUS, OHIO

IT IS A PLEASURE, measured by friendships and associations, that none can deny, when it is allotted to one, at the annual gathering of allied professional people, the privilege of presenting a few thoughts lurking about his mind. Presidents, presiding officers, come and go; the "annual address" goes on forever. Shall this address be a resume of the organization's activities during the past year? Shall the address carry suggestions, plans or schemes of change in policy? Should not careful notice in proper routine order be given to society activities of all kinds? Who in contemplating an annual address has not pondered thoughtfully, then, perhaps somewhat uncertain, desired with much self sympathy the pen of both a seer and a sage, that he might send forth wisdom and advice. What can be grander, giving lasting fame, than to unfold a program in an annual address that will go reverberating down the corridors of time? New light, that the rank and file may be given increased intelligence, that their manual dexterity may be augmented a notch higher, their skill showing an upward slant.

We read of the stone age, the bronze age, the iron age; can this now be the machine age? Did not our ancestors in the stone age live largely by feeling; an actual contact of the five senses alone? What had facts to do with those ancestors? If this is a machine age, what has feeling alone to do with us? A student of human problems very recently tells us that knowledge is the long, long bridge between mere feeling and facts. Members of an association such as ours are presumably dealing largely with facts; the bridge of knowledge does not remain a bridge of youth and student days, but of life. We meet as workers in a common field, we discuss, we read, we ponder over the works and endeavors of our associates; we give a little, we gain much. We are human beings, who before the stone age even, must perforce live and go in packs. Some philosophers are pleased to liken us to the bees in their hives, others to the ants, still others to the wolves who must keep close company or else perish. So it is that our profession must perforce keep close company or else perish. But a profession whose work and thought and study deals largely with facts cannot perish, therefore neither can it exist without association, without close communion. The gang spirit develops early in youth, at first governed by feeling alone, a survival, an atavism, if you please, of our pre-stone age ancestors. How quickly the bridge of knowledge, though, passes over to the land of facts, and the gang spirit of mere feeling gives way to associated seekers of truth, of light; a few here and there developing into creators; some becoming doers of big things, others sayers of wisdom and experience. President

*Read before the Ohio State Dental Society, Dec., 1921.

Roosevelt once picked up an old word of Anglo-Saxon origin, "drang," an irresistible impulse to move forward; a path confined by lateral obstacles requiring straight away passage. So we in our societies present "drang." We must exist and we must move forward. I therefore at this fifty-sixth annual meeting desire to remind you all that this organization is your own, it's the best dental proposition in the State of Ohio.

There is something that brings each of you here this week, what that is you know best. It's a delight to meet old friends, and it's worth while to meet and make new ones. The biggest thing in life is loyalty. To you, to us as dentists, this means loyalty to self and to the profession. Some of us remember the time when one dentist referred to his neighbor dentist as "my competitor." Today we refer to our neighbor as "our associate." Competition? No. Association? Yes. If you can increase the neighborly smile, one with another, these three days, you will go back home having mentally and morally gained; service to yourself, your patients and to the community, will have become a better service. The glad handshake, comradeship, a smile and pleasant greeting with a new member will make this meeting worth while to you. Each year essayists, clinicians and exhibitors are ready to do their best to render the service that makes a meeting of this kind beneficial to you, if you so will it. Pick a clinician or two and get all they can give to you; that's worth while. Listen attentively to an essayist, and you will get his drift; that's worth while. Stop at an exhibitor's booth and he will explain some mechanical device that will be worth while. This is your meeting, not that of the officers and committee men. I met one dentist once who went back home delighted with his first trip to the state meeting; he had spent two evenings at the theater, gone to three picture shows and two matinees. He had registered, obtained the customary accumulation of samples, viewed the large gathering over for a few minutes, and went back home delighted with the trip. Well, at least, he must have known why he came, and he probably got that for which he came. From the standpoint of gaining something to increase his capacity in dental service, he was rather shy, but who can gainsay a better mental attitude after his return back home. The next year found him back again giving close attention to essayists, clinicians and the exhibitions. The first visit, feelings alone governed him; the second visit, facts sent him back home determined never to miss a state meeting.

Man, therefore the dentist, if at all normal, lives in two atmospheres, creative and recreational. In his delicate application of mechanical fitness and precision, does he live his best and do his best always in the one atmosphere? Is he not adding to his fullness of life, dwelling somewhat in that other atmosphere; his garden, pursuing the elusive golf ball, whipping the waters of the streams and lakes. There is glory in creative work, but even that may and does become weariness of spirit and body if kept too long at it. Man's destiny in this world of wonder, of why we are here, is the certain and sure working out of a Creator's plan; as individuals we are here

today and gone tomorrow; the great plan goes steadily on. Horrible as the late war was, democracy as against autocracy won a place which must, in time, bring forth a new and enlightened era for mankind on this celestial sphere. How fortunate that America, founded on freedom of peoples, shall be able to take part in the final redemption of human life and existence. What part are we, as specialists, in the saving and conserving of life, playing in man's destiny on earth? Let us remember again that the longest bridge in the world is the bridge that lies between feeling and fact. The way can be made passable only by knowledge. Why should we believe that the seeking of an education is only a matter of youth. If our profession shall continue as part of the plan of human redemption, should not the intellectual virus interjected during the prescribed educational era of each individual's life, effect a continual improvement of mind, thus proving that education is a matter of life, not alone of youth. So we in our gathering this week have brought before us the thought, the work of those inoculated with the intellectual virus of the healing art. We have heard, during the past few years, very much from the laity, from the medical profession, from our own prophets, that dentistry has a tremendous responsibility in human welfare. The question is not, shall we recognize this knowledge of our position in life, as simply a belated recognition of our work as a part of the service of a profession in the pursuits of health giving, but that we shall recognize that we are from now on expected to enlighten ourselves as to how we are going to shoulder this responsibility. Again let me admonish you that knowledge is the bridge between mere feeling and facts; knowledge is never limited in its stretch between feeling and facts; human progress toward better things must be certain, or else the world is lost. The dental bridge of knowledge in 1840 was limited in its collegiate program to a few months of a year; what must it be in the future if we recognize our responsibilities? As a profession then we must insist that the front end of our dental bridge of knowledge, must be built on strong cultural fundamental science. An individual here and there occasionally may lift himself at his own fireside university, by the boot straps, but our responsibility today is with the multitude in the profession, with the profession in its entirety. The dental profession must sense this great responsibility and get back of a dental educational formula that will meet all requirements of service in the art of healing, of prevention, of a much better health condition in human life.

Two years ago your society endorsed the proposition to bring about legislation, whereby there should be in due time licensed oral hygienists. Last year the ad interim committee, following almost an unanimous indorsement of the membership in session on December 2nd, 1920, referred this proposition to your legislative committee. Immediately after the adjournment of the 1920 meeting, the legislative committee commenced work on a bill which should meet the idea as to the proper status of an oral hygienist, defined and regulated by law. Dr. H. C. Brown, as chairman of the legislative committee, gave careful attention and much time both to the drafting

of this bill, and its passage during the Ohio legislative session of 1921. One of our own members, Dr. B. J. Emery, of Defiance, was very fortunately a member of the state legislature and this bill was placed in his hands for proper introduction before the house, and guidance through the committees. This enactment of the legislature, licensing dental hygienists, should, from now on, become a means whereby a much greater service can be rendered the public. Careful consideration of the value of the dental hygienist should be given by the dental profession of the state, as to the increased opportunity for dental service, safe-guarded by law, under guidance and observation of the dentist.

At this time I should like to present the situation of our society as part of the general plan of component state and national dental society activities. When it was conceived that the various and many society organizations, of local and state nature, could be brought into integral working units with the national society, the solution for a strong unified stand in what should be the real object of society work, was started. This unification is now going steadily on, and in a large number of the states has been well organized and worked out. It should be made clear, here in Ohio, that the National Association is as much a part of our society activities as is the state organization. Our own state society, with its board of directors, has already recognized its obligation to its component societies, and has in the past and will in the future endeavor to carry out ways and means to make the component societies active organizations. The larger number of the components, because of the larger city groups and more advantageous geographical situations, are enabled to carry out their meetings and programs in a very satisfactory manner. Our components number twenty-eight. Just fifty per cent or fourteen of them have monthly meetings; as stated above geographical advantages and the larger cities give this opportunity without burden to their membership in attendance. One of the remaining districts meets six times during the year, and the others as follows—two, four times; three, three times, and six, two times during the year. Two years ago a meeting was called at the December meeting of the state society, of the presidents and treasurers of the component societies in order that the chairman of the component committee, the president elect, and the chairman of the membership committee, the vice-president, could get in personal touch with the members of these two committees, representing the component societies. Last year again such a meeting was called. Both these meetings were informally called during the regular session, and therefore did not result in as much good as hoped for. This year we called such a meeting on Monday evening, prior to the state meeting, largely to meet with Dr. Otto U. King, secretary of the national society, and work out with him a campaign leading towards a substantial increase in our membership. It is the opinion of your president that an annual meeting of the officers of the component societies should be held at the best and most convenient time, at which time the trials, tribulations, the needs of some of our components

can be talked over and threshed out. As a state society our obligations are not done when we have districted the state and then expect each district to paddle its own canoe. There are several districts which must be helped towards a better and more consistent operation. At this annual gathering I believe a report by each president of time and place of each meeting, with names of essayists and clinicians, should be presented. Such reports should be placed in the keeping of the president elect, who under the constitution is chairman of the component societies. It also might be well should each treasurer, as a member of the membership committee, place in the hands of the vice-president, the chairman of the membership committee, such data of membership and non-membership in each respective district as would aid materially in an increase in membership. A closer union between the component society and the state society must be brought about or else we will find some of our twenty-eight cylinders hitting all right on high, but an increasing number, however, misfiring, and finally going not at all. In a few instances such is already the case. Should such an annual meeting of these officers become permanent, programs could at least be tentatively planned out in those of our components meeting but twice or thrice a year. For reasons, very plain to be seen, meetings but two or three times a year in a number of districts are all that such districts can handle. It is now a well known fact that to such districts the state society will, once a year, pay the traveling expenses of some one of the state society members, as an essayist and clinician. But oftentimes, through lack of interest, or busy days or what not, even such opportunities are not grasped to keep the cylinder properly hitting. Oftentimes plans for a meeting are made but a few days before a stated meeting. It might be well at the annual meeting of the component officers, that the chairmen of the committees vitally interested in programs should be present. In all probability none of us know the actual workings and happenings of our twenty-eight components. Both the creative and the recreative activities of society procedures in various parts of the state during the year would be not only of interest but of mutual benefit. I believe therefore that hereafter such a meeting should be held at each state meeting as part of the regular session.

One of the things that should be of intense interest to all members of our society is the decidedly progressive work of our mouth-hygiene committee. The work of this committee during the past year has been of very great value in an educative way. The committee in person has reached over 20,000 people with a message of mouth hygiene, delivering seventy lectures; and it is of interest to note that they traveled 5,529 miles during the past year. Their message of the need of mouth hygiene should be carried by us all to all our various business and civic organizations wherever our membership may be found in active participation. No doubt, the activities of members of our committee has been largely responsible for the appointment of Dr. E. L. Pettibone as a member of the Council on Mouth Hygiene and Public Instruction of the National Dental Association. Present and

past members of our committee were largely responsible for the mouth hygiene program at the 1921 meeting at Milwaukee of the National Dental Association.

We should go back home and enthusiastically carry out the slogan adopted at last evening's meeting of the officers of the component societies, in that our membership shall be increased to 2,000. It will need the whole hearted work of all our components to see that all eligible non-members of the profession be brought into membership. There are probably in the neighborhood of four thousand dentists in Ohio, and our present membership of 1,600 should at least equal or pass fifty per cent of our dental population.

The library of the Ohio State Dental Society is now in individual type and volume, one of the three or four largest libraries of the country. We can well be proud of this record, and especially at this time I desire to call attention to the long and arduous service of Dr. E. C. Mills in building up so valuable an adjunct to our society.

It has often been brought to our attention that the enforcement of the dental law is not altogether what it should be. We are continually reminded that the proper state or county officers can and will prosecute all cases when evidence has been produced. The production of evidence necessarily requires a proper financial status, as well as an open and aboveboard attitude of the profession at large in obtaining evidence. Careful consideration should be given by the state society concerning the reasons why no financial support is obtainable at this time to properly aid in the obtaining of evidence. If we are sure that our society's activities have much to do with service to our citizenship in health, then we should recognize that we must awaken to the fact that part of our service is in gaining and maintaining good citizenship. We must all recognize that there is a great lack of co-operation of many or most dentists in an endeavor to enforce our laws. During the past few years attempts have been made, by means of amendments to our dental law, to strengthen the enactments against illegal practice of dentistry. Something, however, has militated against such enactments. If such enforcement can be aided by a legal change in our law, then we should all give our undivided support to the state society's legislative committee in bringing about new legislative enactments. If legal annual registration will better conditions, then such registration should be given careful attention with probable enactment. We must keep always in mind that there is a definite responsibility upon our profession to maintain our share in building and upholding civic society. It is the duty of us all to do everything in our power to help enforce the law.

The following letter was received on November 10th, which is largely self-explanatory:

"At a meeting of the Council on Mouth Hygiene and Public Instruction, held in Chicago on November 4 and 5, I was instructed to send the following letter which is self-explanatory:

"Under authority of President Hartzell and the Council on Mouth Hygiene and Public Instruction, I am writing to request you in your official capacity to use every means at your command to insure success of the campaigns now being conducted by the Dental Welfare Foundation for the ethical dental education of the public.

"To this end, it is suggested that a bulletin or personal letter should be issued from your office urging individual members of your state society to subscribe for the service, in addition to which I wish you would request the officers of local societies to adopt a similar policy and request them to make the same request to officers of their component organizations.

"The activities of the Dental Welfare Foundation are under the complete control of the National Dental Association which, at the Milwaukee meeting, unanimously endorsed the movement that in the event of a successful issue is calculated to improve the health and prolong the lives of the American people.

"The campaign is being conducted wholly without profit and I will personally vouch for the integrity and motives of those in authority."

Fraternally yours,

OTTO U. KING,
Secretary.

The House of Delegates at the Milwaukee meeting placed themselves squarely behind this movement. The only opposition offered at this meeting was the thought that it might cause doubt in the minds of extreme ethical members. Both the House of Delegates and the Board of Trustees believed this publicity movement to be pure publicity of health knowledge without advertising connected with it, therefore no votes in either body were recorded against it. Sometime at this meeting, recognizing ourselves as part of the national organization, we should give this plan, "The Dental Welfare Foundation for the Ethical Education of the Public," careful consideration.

We are fast drawing to that time of the year when we express good will, good fellowship and many happy returns, when we breathe the Christmas spirit of service into ourselves, when we fondly believe that it is more blessed to give than to receive, we rejoice in our home gatherings, surrounded by our friends, happy in doing unto others; how fortunate that such a season shall come at least once every twelve months, to turn us from the very much in evidence inborn selfishness of our human make-up. Why cannot the dental profession in much more, and with growing enthusiasm, of a substantial way, give support to the National Dental Relief Fund? If this fund is worthy, then its success depends upon the whole hearted support and co-operation of all. Its worthiness is proven in its slogan, "Say it with Christmas seals to widows, orphans, and indigent dentists."

One dollar is a very small sum for an annual contribution to so worthy a cause. This fund has grown during the past ten years to approximately \$65,000. The plan of the relief fund provides for the creation of an endowment of \$100,000. Upon the securing of this fund of \$100,000, the interest from it, plus the continual contributions from the sale of Christmas seals will be used as needed for relief purposes. "For I was an hungered and ye gave me meat; I was thirsty and ye gave me drink."

May I again refer to activities of the national association, in that a health exhibit from the dental standpoint will feature the 1922 meeting and that there will be a focusing of the attention of the whole profession and laity as well during the coming year on the idea and knowledge that dentistry can and does lengthen human life. This evening's program will visualize and stress this thought. The co-operation of our components between now and the meeting of the national at Los Angeles, at the various meetings this winter and spring, should carry the idea of spreading throughout our communities, that dentistry can and does lengthen human life. It would be well, should one or more essayists in each district, feature such a propaganda. It has always been thought that dental and other professional organizations should maintain an existence similar to private clubs rather than public organizations. To a large extent this should be so, but public welfare is part of our obligation, and public welfare consists of proper fusion of the interests of all peoples making up society. What constitutes the greatest possible good to society and each individual in it, should be part of our work.

I wonder if we realize that much of the old way of viewing one's individual responsibility to society at large has changed very materially during the past few years? As the war ended and our citizenry commenced a readjustment of a war torn state of mind and being, it seemed that America for Americans alone should be our whole thought and desire. That we should do well to look to our own happenings, our own salvation; that the rest of the world must clean its mess as best as possible, leaving us to our own more fortunate condition, yet with stupendous and heavy responsibilities, to the citizenship of the nation. That a national being, already somewhat manifested as "America" should be allowed to grow and foisture in this land of the free and home of the brave, without entanglements of any nature beyond our border. However, one provision was in the minds of all, and that was that some how and in some way, such a new and wonderful America would become a grand and glorious example to the more or less benighted peoples beyond our border. That we should help save the world by example, rather than precept; by example rather than co-operation; by example rather than service; by example rather than part of a co-ordination of the world. But how soon we awoke from our dream of an isolated national existence, with example alone, our part in helping the war weary world to slowly right itself. Today the thought is uppermost in the minds of all clear thinking men and women that America can do its bit

by precept, by co-óperation, by service, and by co-ordination to those beyond our borders. Our thoughts, our hopes, our prayers should go out to our representatives and the chosen leaders of other nationalities at Washington, while they work and strive to bring about world wide conditions that will ease individual as well as national and international burdens. That a way may ultimately be brought about which will lead to charity to all, with hate, rivalry and selfishness reduced to a minimum. We know the millennium has not arrived nor is it yet near at hand; human greed, the frailties of national existences, political ambitions, and racial antipathies are still conditions and characteristics to take into consideration. As we pray, we must watch; as we pray, we must hope, and as we pray we must strive to overcome the thought in our own minds that there is no such thing in the world as an ultimate good. The world is beautiful, as manifested in nature. The skies present to us a wonder, beyond our ability to contemplate; the manifestation of nature, in its zeal to produce, to make a striving towards the beautiful, to create a wonder world around about us, we contemplate with delight in our eyes and awe in our minds. Do we realize that we are part of a beautification; a planning towards better, bigger and more wonderful manifestations of the Great Architect? If we do not, then why should not chaos, ultimate ruin, be the goal? If we do realize such a plan then we can rejoice in our own little endeavor to help towards its fulfilment. Shall we remain dentists alone, confined within the four walls of our professional being, doing our work for those who seek us, who request our professional attainments, and actuated alone for the financial gain? If we are what we have become to believe we are, we owe much in the service of good citizenship, we owe more to the world than an exemplary example in our offices and our homes; we must seek and find, each in our own community, a place to do our part by precept, by co-operation, by service and co-ordination. Dentistry is not a profession because those in it say it is; it is a profession if the world at large recognizes its service extended beyond its four walls of daily routine. The dentist's usefulness as a citizen will be complete when he gives his intellect, his energy and financial aid in directing the constructive forces of his community towards those affairs which will enhance public welfare.

A few years ago there was organized in this state, an association known as the Ohio Public Health Federation, with a membership from a number of the associations interested in health conservation. Medicine, and its several branch types, also dentistry, veterinary medicine, pharmacy, graduate nurses, funeral directors, embalmers, and other organizations make up its membership. The policy of this organization is not only mutual benefit against wrongful legislation but to aid each other in all matters that tend towards better conditions of health conservation by legislation. We are indeed proud of the fact that the chairman of the Federation has been our own Ohio State Dental Society representative, Dr. H. C. Brown. It is a pleasure to note that at its last meeting, held in Columbus, October 27th, it

was decided that this Federation should continue and that action should be taken to broaden its scope and increase its effectiveness. Also at this meeting its chairman was unanimously re-elected to serve another year. We should recognize the worth of such a federation, and its value to the various professions interested and be ready at all times to use our influence, always in a rightful way, to bring pressure to bear on any legislative matter sanctioned by its officers. There can be no doubt but that we strengthen our own professional standing by associations of this kind.

It is of interest to note how a slow, but gradual interest in conservation of the teeth and healthful conditions of the mouth is growing throughout the nation. Already a few states have enacted state laws with financial aid, towards a state wide teaching and professional care of the the children, in regard to their mouths. If we are to take our place among those intense in their desire to decrease the ravages of ill breath and to build up from infancy a better and stronger race, then we should constantly be on the alert to give our aid and our support to any and all measures of this nature. As time goes on there will be put in operation, in various places, an organized effort to try out by interesting ways and means, methods to study conditions leading towards better breath for our youth. Dentists in such locations, which may be chosen, will certainly fall short of their opportunity, should they neglect to insist that part of such work should carry in its scope, mouth conditions. The old adage that "the Lord helps those who help themselves" is still true. Also, we must keep continually urging in our many localities the fact that the thousands of wards of the state must receive adequate dental service. Not a single member of the legislature but has his own home dentist, and it should be, it must be, the prerogative of such dentist to educate his legislative friend and patient to the deplorable condition prevailing in many of our institutions. I am glad to say that within the past few years a few institutions are doing the best they can with limited means to give dental service, and that the State Board of Administration, with its financial restrictions, are recognizing the needs of dental service. Especially should the desirability of the health of the mouth and the conservation of the teeth of our school and pre-school youth be kept before our school authorities.

It will not be out of place to call attention to the fact, again, that we have both a creative and a recreative make up. Our work takes the creative side of our being. If we are interested in the work, then it is easy to keep at it, unsparing of energy, and achievement is limited only by capacity for work. To a very large degree love of the work actuates one in the continuance of such work. Pitiful is the man who continues as a misfit, actuated only by pride to continue where he should not be. However, what seems to be distasteful is more often simply an over indulgence in the creative side of our nature. A hobby we recognize as that which we pursue with delight. It is now often referred to as something apart from our avocation. Very well, have a hobby, let it be something on the recreative side of our nature.

Ride this hobby-horse at stated periods, let it take you out into the realm of make-believe, or what you will; give it a loose rein occasionally, and back you will ride, sweetened in temper, clearer in mind, a joy to yourself and the world at large.

I desire to express my thanks to all the committees having charge of the various activities of this meeting, for their whole hearted endeavor to make their part of our organization a success. Especially have the chairmen been eager and glad to render unselfish service to carry on the good work of this society. The essayists and clinicians have unselfishly signified their desire to do their part in helping you to enjoy this meeting, for which I desire to thank them. Each year we come to our meeting and find that the Great Reaper has gathered to the long home of rest and blessedness some of our friends and associates. Fortunately memories of pleasant associations with them remain with us, their presence once with us has left something worth while with us. Now, lastly, I wish to express my own appreciation to you all for the honor you conferred on me, the privilege of serving you in a humble way as your president.

There is nothing baser or meaner than to hate the honest man who has prospered simply because he has prospered.

REPORT OF A CASE OF CEPHALIC CHANCROID
AND A CASE OF ENCEPHALITIS FOLLOWING EXTRACTION
OF A TOOTH THAT HAD INFECTION AT APEX*

BY HERBERT A. POTTS, D.D.S., M.D., CHICAGO, ILL.

EXTRAGENITAL CHANCROIDS are by no means rare, but are far less frequent than extragenital chancres.¹ Those on the fingers and hands are occasionally observed, but few cases of cephalic chancroids have been described.² This is not surprising, for conditions about the face and head are not advantageous for the successful inoculation with the Ducrey streptobacillus.

Chancroids, other than those of the penis, have been reported on many different portions of the body, upper and lower extremities, abdomen, lips, eyes and buccal cavity, but in all reports of series, digital chancroids are by far the most frequent.³ It is necessary that there be an atrium through the skin for the entrance of the bacillus, and this requisite is most often present extragenitally on the fingers, as the hands most often come in contact with the initial ulcer.

Not all extragenital chancroids are the result of autoinoculation. The handling of another's infected parts is often the cause of digital chancroids, especially in physicians, and the use of a soiled handkerchief⁴ was proved in at least one case to have been the etiological factor.

CHANCROID OF CHIN

The following is the report of a recent case of an extragenital chancroid occurring on the chin with a definite submental adenitis or bubo:

J. S., a negro, aged 23, entered Cook County Hospital, October 12, 1920, because of a painful swelling beneath the chin. He did not seem to be acutely ill, and was of good nutrition and stature. Regional examination revealed that his scalp, ears, eyes and nose were negative. His mouth was in poor condition. The lower left bicuspid and first molar were carious to such an extent that the vitality of their pulps was lost. The mucosa of his mouth was normal, as were his tongue and throat. Examination of his face revealed a small pustular lesion less than 0.5 cm. in diameter on his chin just to the left of the median line. When questioned as to this lesion, he said that he had noticed for the last two or three days a small pimple in this region but had paid no attention to it, but admitted that he thought it was increasing in size. Beneath the chin there was a round, movable tumor, rather deeply situated below the symphysis, about the size of a crabapple. This mass was very sensitive to touch, was firm, and did not fluctuate. The chest, abdomen and reflexes were normal. A search for adenopathy revealed

*Read, 1921, before the Section on Stomatology (A. M. A.) of which, by special arrangement, THE DENTAL SUMMARY is the representative organ for the dental profession.

some small, hard bilateral inguinal glands. An examination of the genitalia revealed an ulcerated lesion with ragged edges, somewhat elevated, but not indurated, on the right dorsal surface of the coronal sulcus. This ulcer was nearly round, about 1.5 cm. in diameter, and was of about two weeks' duration.

Laboratory examination revealed 5,280,000 red and 11,000 white blood cells with a hemoglobin content of 95 per cent. The urine was negative. A smear from the genital lesion, under the dark field illuminator, revealed no spirochetes. Stained with corbolfuchsin, the coccal forms were so profuse that no bacterial differentiation could be made. The blood Wassermann test was negative.

As a result of the examination a diagnosis of genital chancroidal infection together with a submental adenitis, either from a facial or an intra-oral infection, was made, although it was recognized that normally the affected teeth did not drain into the submental region. Appropriate chancroidal treatment was instituted, and hot dressings were applied beneath the chin.

Five days after entrance, fluctuation was thought to be demonstrable below the chin, and an attempt was made to aspirate the gland, but was unsuccessful.

During this time the lesion on the chin became larger and encrusted. When the crust was removed, a ragged ulcer about 1 cm. in diameter resulted, looking not unlike the chancroidal infection on the penis.

Ten days after entrance, the gland beneath the chin was opened and curetted, the result being an abundance of thick caseous material. On account of the rapid liquefaction of the gland, and its painful character and the similarity between the lesions, a tentative diagnosis of chancroid of the chin was made.

A culture of this material was made by Dr. D. J. Davis,⁵ of the University of Illinois Medical School, who reported:

"The content of the abscess was examined bacteriologically. It contained many pus cells, necrotic tissue, and much blood. In stained smear preparations no bacteria were found even on careful search.

"Suspecting the presence of *B. ducreyi*, the material was cultivated in blood. For this purpose six small tubes containing about 2 c.c. of fresh human, defibrinated blood were prepared and each inoculated with diminishing amounts of the material. Heavy blood agar tubes were examined, and in three of the six growths *B. ducreyi* appeared. A few *Staphylococci albi* grew in two or three of the tubes, but not in all. It was impossible to state whether or not they were contaminators or secondary invaders; probably the former, since they were not found in all the tubes.

"The bacilli after twenty-four to forty-eight hours' growth appeared in typical tangled clusters of streptobacilli. Many also appeared in short and long chains. On superficial examination, morphologically they resemble growths of *Streptococcus viridans*. They are short, oval bacilli, stain with difficulty with methylene blue, and are gram negative. On solid mediums

they form small, gray, opaque colonies from 1 to 2 mm. across, which appear in twenty-four hours and grow to maturity in two days. On plain mediums they gave no growth."

Argyrol crystals⁶ applied to the lesion, and cleanliness, led to a speedy recovery.⁷

"That the Ducrey bacillus is the specific cause of chancroid there can be no doubt. Ducrey in 1889 made fifteen successive human inoculations with material from the lesion, finally obtaining a lesion in which practically only the streptobacilli were seen. He did not then know how to grow it. This was done by Lenglet in 1898, who cultivated it in human skin agar covered with blood. Heavy blood mediums or pure blood, defibrinated or not, have now come into general use in growing it. At least three workers, Fisher, Lipschütz and Tomaszewski, have inoculated themselves with pure cultures and caused typical chancroids. Monkeys are susceptible; also the cornea of the rabbit.

"Extragenital chancroids are not uncommon on the lower part of the body, but are rare about the head and face. In Kolle Wassermann's *Handbuch*, Stein quotes Petersen as having observed twenty-seven extragenital lesions in a series of 9,000 chancroids. Ullman collected from the literature and his own experience sixty-four extragenital chancroids. Of these, forty-nine had both genital and extragenital lesions (as in the case here reported); twenty-two were on the fingers. Of chancroids in other localities, one is reported on the gum of the upper jaw, two on the conjunctiva, one on the tonsil, one on the tongue, one on the soft palate and wall of the pharynx, and one in the external auditory canal. None was found reported on the chin."

CONCLUSIONS

This patient had primarily a genital chancroid, and carried the infected material from his genital lesion, implanting it upon his chin, where it produced a typical lesion with the characteristic painful regional bubo with early liquefaction.

ENCEPHALITIS FOLLOWING EXTRACTION OF TOOTH

My object in reporting this case is to call attention to some of the dangers that may attend the extraction of a tooth, and to deprecate the too frequently adopted method of multiple extraction of teeth at one sitting.

The extraction of a tooth is just as important and should entail just as much care in preparation, skill in technic and thoughtful after-care as other surgical operations. In fact, the possibilities or complications are greater here than in any other region of the body. There is no other region of the body which harbors such multitudes of bacteria, both putrefactive and pathogenic, nor any part which so effectively resists them. So far as the usual practice goes, we have utterly disregarded the advance of science, and for all the benefit derived, it were just as well if Virchow, who proclaimed the cellular pathology, and Pasteur, who made surgery possible, had never lived.

Practically no attention is paid before extraction to the condition of the oral cavity. The condemned tooth, covered with septic débris and calculus, is untouched until it is grasped by the forceps, the blades of which are forced into the soft tissues and bone, carrying infection into the newly made wounds.

The general surgeon of today would be justly sued for malpractice, and his license would be speedily revoked, if he operated in like manner, and after having operated dismissed his patient, not expecting to hear from him or see him again.

The laity, because of such barbarous treatment in times past and because of little advancement in practice up to the present time, does not know any different; it does know that instruments should be boiled, but of what value are sterile forceps if they are to be literally smeared with dangerous bacteria just before being pressed into a wound made by these same forceps? Furthermore, not only is no fear evidenced in creating one infected wound, but half a dozen or even two dozen teeth are treated in the same manner at the same sitting, leaving lacerated gums separated from the bony process; and the patient, still bleeding, is dismissed.

It is unfortunate that the individual who extracts teeth is not compelled to take care of the patient until he be restored to his former state of health. If that were the case the extractor would very soon learn that not a few deaths and many complications and untoward sequelae follow what is thought to be an inconsequential incident. The fact is that when the patient falls ill as the direct result of the extraction, it is his physician who finds a cellulitis, Ludwig's angina, necrosis, lymphadenitis, phlegmon of the neck, meningitis, brain abscess, or some other septic process in distant parts, which may be directly traceable to the extraction. These are all possibilities and are not so infrequent as they may seem. Now, how can we lessen their occurrence? In the first place, we must make application of our knowledge of pathology and bacteriology, realizing possible developments following operation within an infected field on an infected organ.

Secondly, we should apply the principles and practice of surgery to each operation, and exercise judgment as to the number of teeth to be extracted at one sitting. We know that at various times we do have showers of bacteria appearing in the blood stream. We also know that, in order to produce a lesion of infection, we must have a sufficient number of bacteria. The relationship between virility of bacteria, number of bacteria, and resistance of the body or tissues, on which in varying degree the establishment of infection depends, is beyond our calculation or comprehension; consequently we must avoid carrying bacteria into the tissues, we must avoid as much as possible the dissemination of bacteria already present, and we must endeavor to have the patient in the best possible health. Usually, however, we must choose the lesser evil. Undoubtedly the bacteria present within the granulomas at root apices may, by the manipulation consequent to extraction, be forced into the lymphatics and thin walled venous capillaries, pass-

ing readily into the general circulation. Thrombophlebitis in any part of the body with septic liquefaction of the thrombus liberates bacteria directly into the general circulation; consequently we should seek to avoid such possibilities. The following report seems clear cut, and I am allowed to report it by the courtesy of Dr. W. B. McClure, of Evanston, Ill.:

A woman, aged 42, consulted Dr. J. A. Lichty, of Pittsburgh, November 12, 1920, complaining of nervousness, becoming more marked during the last three years; there was some palpitation, dyspnea and slight tremor on exertion; also constipation with occasional diarrhea. There had been some loss of weight. Physical examination and laboratory tests revealed little abnormal except a white cell count of 4,200, with 50 per cent polymorphonuclears, 27 per cent large mononuclears, 21 per cent small mononuclears, and 2 per cent transitionals. Gastric analysis revealed: free hydrochloric acid, none; combined hydrochloric acid, 20 per cent.

A roentgenogram of the teeth disclosed several apical infections, and because of them it was decided to extract these teeth. November 26, at about 3 p. m., the upper right second bicuspid, which had been free from tenderness and swelling of the soft tissues, was extracted by a careful, competent dentist, a local anesthetic being employed.

The granuloma came away with the tooth.

The next morning, November 27, the patient awoke with a headache and, as she expressed it, "felt miserable." The temperature at 11 a. m. was 99.8. November 28, the headache was less severe, but the face and ears were red and burning, the highest temperature, 100.6.

The following morning, November 29, as the temperature was nearly 101, the patient stayed in bed. At noon a fine rash was noticed on the face, neck, chest, shoulders and thighs, which by November 30 had spread over most of the body and which almost disappeared during the next twenty-four hours.

November 30 there was a chill, the highest temperature being 101.4, which on December 1 rose to 102.4. During these days the morning temperature was about 99.8 and the family physician, Dr. A. M. Lichty, decided that it was not a case of scarlet fever.

December 2, the temperature was around 102, but on December 3 it rose to 103, and it was noticed that the patient had difficulty in finding the right words to use, and later answered "yes" and "no" only.

December 4, the temperature was normal but the patient seemed weak and languid, and objected to being bathed, complaining of soreness in her muscles, especially those of the back of her neck.

In the early afternoon she made no effort at speech, but followed her attendant with wide open eyes as she moved about the room. The evening temperature was normal, but the patient paid no attention on being questioned and later had a convulsion, lasting ten minutes, with opisthotonos, after which she became comatose.

Following the convulsion her temperature rose, reaching 106 by axilla

the next evening, when it was noticed that there was rigidity of the neck and arms, more marked on the left side, with very little rigidity of the legs.

Lumbar puncture, December 5, yielded a clear fluid under little or no increase of pressure. Culture of the fluid was negative.

The urinary findings were normal throughout.

The blood examination revealed: red blood count, 4,390,000; hemoglobin, 72 per cent; white blood count, 8,600. Differential count: polymorphonuclears, 62 per cent; small mononuclears, 28 per cent; large mononuclears, 5 per cent; transitionals, 3 per cent.

Examination of the heart, lungs and abdomen, December 5 and 6, were negative. Within three days the temperature had dropped to normal. The patient remained in coma until the afternoon of December 6, when she opened her eyes for a short time, but at 11 p. m. she again awoke, became delirious, and was restrained with difficulty; December 8, she fell into a quiet, restful sleep, and on awakening her mind was quite clear.

Within the next few days she continued to improve, both mentally and physically, and at the present time weighs more than she has for several years.

COMMENT

It may be questioned whether the encephalitis which is believed to have occurred was due to a bacteremia precipitated by the disturbance of the focus of infection, on the ground that it might have been a coincidence; but it seems logical to assume that such was not the case. We have examples of rupture of tuberculous glands into the thoracic duct, producing a hematogenic tuberculosis; we have brain abscesses in the course of bronchiectasis, and we see multiple abscesses in the skin from a thrombophlebitis.

We must have reports of more cases of sepsis following extraction of teeth, and a further study of them in order that we may know what to fear when we extract a tooth.

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⁵Davis: *Jour. M. Res.* 9: 491, 1893.

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⁷I am indebted to Dr. Richard Bower, my intern, for the review of the literature, and detailed report of this case.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRs. WENKER, PETTITT, DORRANCE AND POTTS

DR. ROBERT H. IVY, Philadelphia: Carcinomatous and sarcomatous odontomas need further investigation before they can be established as definite pathologic entities. In the cyst cases reported as having a lining of connective tissue cells, it is likely that these are either epithelial cells flattened out by the pressure of the fluid, or the epithelium which originally lined the cavity has been lost by atrophy. It is not the situation of the developmental points of fusion of the jaw bones which determines the location of dental root cysts but where the periapical infection leading to the cyst happens to be, and sufficient space for development. Root cysts are not so often found in the region of the symphysis of the lower jaw as in the premolar and molar regions. They are frequent in the anterior portion of the upper jaw because the teeth in this location are

often pulpless and there is plenty of room for expansion. Root cysts are often found in parts of the jaws from which the teeth have been lost. Partsch's operation is not an extirpation but a marsupialization. This method is preferable to shelling out the entire cyst wall in the case of the larger cysts of the upper jaw because of the danger in the shelling out process of creating an opening into the nose or the maxillary sinus, which may be very difficult to close. The complete extirpation is reserved for small cysts or for those in which there is difficulty in creating a wide opening. In all cases in which any epithelial lining is to be left behind, the communication of the cyst cavity should be with the mouth rather than with the nose, because the subsequent course of the case can be inspected directly. The solid central tumors of the mandible are more common than the adamantine growths. The differential diagnosis of central tumors, that is, fibroma, fibrosarcoma, giant cell myeloma, and various types of cysts, can generally be made by radiographic and clinical examinations. In the root cyst there is nearly always present a tooth with a devitalized pulp or the history of the extraction of such a tooth. In the dentigerous cyst the tooth will be absent from the arch and will be shown radiographically to be unerupted. In the tumors containing solid tissue the full complement of teeth may be present and the radiographic picture will show evidence of the presence of solid tissue in the bone cavity. The rare case of chancroidal infection of the chin reported by Dr. Potts warns us to be on the lookout for such infection.

DR. THEODORE BLUM, New York City: Cysts show no predilection, but attain larger proportion in more cancellous bone. I have seen two cysts caused by devitalized temporary teeth. In the majority of cases without fistula, I have found the contents sterile. When the fluid was straw colored, the cholesterolin crystals were golden yellow; when the fluid was dark brown, the crystals had a silvery appearance. Microscopically, the cyst membrane showed an epithelial lining. Grawitz claims that it is derived from the oral mucosa. I have found only one case in which a maxillary cyst had broken into the antrum. The diagnosis of cysts in the maxillary molar region from the roentgenogram alone is quite difficult in the absence of characteristic clinical symptoms, as in cases originating from buccal roots, in which the cyst is mostly formed outside the maxilla. I wish to correct the statements made by Drs. Dorrance and Ivy that the Partsch operation is the most conservative. Partsch describes a conservative and a radical operation. The conservative is used in cases of large cysts especially in the maxilla, to avoid opening into the antrum or nasal fossa. Many operators have felt that for fear of recurrence here, conservatism was not in accordance with surgical principles. This has been disproved by Partsch who, in 1898, reported 200 cases in which microscopic examination of the membrane showed that it had changed into one practically identical with the oral mucosa.

DR. THOMAS L. GILMER, Chicago: I have been accustomed to classify cyst and odontomas of the jaw separately, since, strictly speaking, an odontome is not a cyst. In my collection of odontomes none had cyst walls, so far as I was able to find. I favor a less complicated classification of cysts of the jaw: (1) follicular cysts; (2) dentigerous cysts; (3) cysts associated with the peridental membrane of teeth having septic roots, and (4) cysts found in any part of the jaws seemingly having no connection or relationship with the teeth. The origin of these cysts, with the exception of the follicular cysts, has not, to my knowledge, been determined. Class 1 may be associated rather definitely with the tooth follicle and contains only one tooth. Class 2 has been attributed to epithelial rests. Class 3 may be associated with the epithelium of the peridental membrane of teeth having septic root canals. Class 4 does not appear to have any connection with the teeth in their origin. The most satisfactory explanation of the origin of this type is given by Eve. He supposed them to be an inclusion of a part of the epiblast layer by the mesoblast in fetal life. Later the epithelial cells are stimulated by some influence to growth and multiplication, forming a cyst. I have seen cysts of this kind develop on both sides of the mandible simultaneously. No part of the jaws seem to be exempt. I have never seen a jaw cyst become malignant or a cyst wall become calcified. Formerly, in the removal of jaw cysts, I packed the cavity with gauze. For the last year, instead of packing, I have, after removal of the smaller cysts, induced the flow of blood into the cyst cavity, completely filling it, then suturing over it the flap of gum and periosteum, which had been carefully elevated before the operation, so as to completely close the opening. As yet in no case thus treated has infection occurred. I prefer to depend on complete mechanical removal of cyst walls rather than on the use of escharotics. I have never seen a case of secondary chancroid develop on the face. The ignorance of some tooth extractors is appalling, and it is doubtful if they realize the serious results which often follow their wake. I have seen many fractured, dislocated and infected jaws following removal of teeth by extraction specialists. Since the fad for "surgical removal of teeth," we may expect more serious infections resulting.

DR. M. I. SCHAMBERG, New York City: If a surgeon were to use a cautery knife in the removal of malignant growths much dissemination of tumor cells might be prevented, but I cannot agree with Dr. Bloodgood as to cauterizing cystic conditions about the jaw or epulis. I have never seen an epulis that did not spring from the peridental membrane or periosteum, with the base of the growth directly in the cancellous structure of the bone. Any attempt to remove these tumors in a nonsurgical manner is very likely to be followed by recurrence. It is bad policy to try to destroy the center of a growth by cautery without trying to close the wound or to leave any part of the membrane. If the Partsch operation is done that likelihood is not great, but any piece of epithelial tissue left in the enclosed wound is very likely to encourage recurrence. That is the reason why multilocular cysts so frequently recur after operation. We are going to see a lot of damage done by unwise judgment in the surgical removal of teeth yet I do not want altogether to agree with those who believe that the surgical removal of foci of infection is contraindicated.

DR. HERBERT A. POTIS, Chicago: Dr. Bloodgood said that within a few years every dentist should have a cautery. Many surgeons and physicians do not realize the distinction between dentistry and surgery of the mouth. It would be a mistake to recommend the universal use of the cautery; in fact, I know that there are dentists who might keep a cautery in their offices with the object of cauterizing anything that might turn up. Almost every week I see a patient whose dentist, seeing a swelling, stuck a scalpel into it and as a consequence, a simple cyst has become infected and a lot of trouble has followed. I was interested in Dr. Moorehead's idea of splitting the soft palate. Giles advocated leaving the soft palate attached to the posterior border of the hard palate and not attempting to close the hard palate. He does this for perfection of speech. The cleft of the hard palate will need to be closed by a plate. The social position of the patient might tip the balance in choice of procedure. If the soft palate is not dropped down, increasing the distance between the soft palate and the vault of the pharynx, it seems that we might expect a more perfect speech.

In regard to the etiology of multilocular cysts, I did a complete resection, going beyond the diseased bone, and I found areas of hemorrhage, or at least reddened areas. I removed another half inch of bone. In this bone were coils of blood vessels, like the glomerulae of the kidney. It was seemingly the development of other little cysts, which may account for the recurrence of a multilocular cyst in the remaining bone after resection through apparently normal bone. Granulations never suppurate unless contaminated by pus-producing organisms. Simple granulomas always contain streptococci, either *S. viridans* or *S. hemolyticus*, or both. Granuloma with sinus means secondary infection. It has been my habit to enucleate these cysts, let them fill with blood and suture the wound. I have been partial to the Partsch operation for a long time. The tendency which the bones of the face have to assume their normal contour in a few months is remarkable.

DR. V. P. BLAIR, St. Louis: I have seen twelve or more young people die from extraction of the teeth, and in every instance but one the extraction was done during an exacerbation of the infection. I do not believe the trouble is ever caused by the organisms floating around in the mouth. It comes from the organism which has its habitat at the root of the tooth and sometimes deep in the pockets. For that reason, as a surgical practice, if I have to operate quickly, within two weeks of the time I see a lesion in the mouth, I do not have the teeth cleaned because I have seen so much trouble started up by energetic cleansing of the teeth after the patient was injured.

DR. L. T. LE WALD, New York City: It is the general opinion that a tumor developing in the bone in a case of Paget's disease is unquestionably sarcomatous. Such is not the case in my experience. There may be areas of degeneration that go on to cyst formation, but if one studies these areas one would never mistake Paget's disease for sarcoma. I once performed a necropsy on a man who died as the result of meningitis following extraction of an impacted third lower molar. It was very difficult to say whether infection was there prior to the extraction, but the probabilities are that the condition troubled him for some time and he finally decided to have the tooth extracted. The necropsy revealed a basilar meningitis, which was the cause of death.

DR. G. I. V. BROWN, Milwaukee, Wis.: We are in a rather uncertain stage with regard to the differential diagnosis between a malignancy of serious character and a nonmalignancy in these cysts and growths of the jaw. I do not close up any opening in the jaw, when I am not sure of its contents. I am not nearly as much afraid of the secretion of the wound as I am of what might be inside the cyst. With regard to multilocular cysts, whether they are malignant or not, there is no question that they tend to expand. I would not disarticulate a jaw and deform the patient unless I knew I had to do it. We might just as well recognize the fact that unless we are going to deform jaws unnecessarily, we must use radium and the roentgen ray.

DR. F. B. MOORHEAD, Chicago: Certain well defined pathologic conditions are seen

in the mouth that are not seen elsewhere in the body. The special physiology of the mouth requires special attention. The mesothelial group of tumors seen in the mouth is well defined and easily classified. First, the small, hard, nonvascular, slow growing fibroma, which may exist for years. Second, the vascular fibroma which grows rather rapidly and in cases becomes quite large. Third, the giant cell tumor which differs from the vascular fibroma in that it contains large numbers of giant cells; probably nothing more than a coalescence of fixed tissue cells through the active stimulation of blood supply and consequent rapid growth. None of these three types is malignant. The so-called giant cell tumor is a benign affair, never invades bone, never metastasizes and never destroys life. It is a mistake to classify this as sarcoma. Fourth, the sarcoma, which is malignant in terms of the size of its elements. The giant cell sarcoma of the jaw is the least dangerous of the various types, and offers the best prognosis when removed intelligently. On the other hand, the small round cell sarcoma is always fatal, as is very largely true of the mixed cell or spindle cell type.

DR. GEORGE M. DORRANCE, Philadelphia: In the differential diagnosis between these tumors we have not had much difficulty except in those situated in the posterior half of the lower jaw. In these cases a frozen section is of great assistance. I do not like the operation that opens these cysts through the roof of the mouth. Patients will have difficulty in swallowing and in talking. The Partsch operation is perfectly well known. The Dencha operation, a modification of which I use, is particularly indicated when the cyst fills up a large surface of the nasal cavity. Putting radium into these mouths is not a simple matter. In a number of cases I have injected alcohol into the fifth nerve or its branches on account of the terrific pain produced by the use of radium. Almost every patient who has had radium treatment for tumor of the lower jaw develops severe pain.

Never allow yourself to owe anybody
more than you can pay; never allow
anybody to owe you more than you can
afford to lose.

FLINT DENTAL CLINIC

BY WILLIAM R. DAVIS, D.D.S., DIRECTOR, FLINT, MICH.

DURING THE PAST FIVE YEARS Flint has taken some progressive strides in matters of public health. In 1917 it employed its first full-time health officer and had at that time one full-time city nurse and one full-time school nurse. Today it is employing three full-time physicians, five full-time dentists, eight city nurses and eight school nurses. From a single room it has grown to occupy an entire building near the City Hall, called the Health Center, which is the scene of busy daily activity. In addition some four or five outlying branches are used daily or part time in the dental and baby departments. But it is not of size that we would speak, for this means little.

As a member of the Board of Health staff the thing for which we are most proud is the fact that politics, so-called, has played no part in its organization and the whole staff is dominated with the ideal of efficient, economical, forward looking service to the city. The watchword is not only correction but prevention. Flint's general death rate today is the lowest of any of the larger cities in Michigan, and we believe the activities of this department, not in any one line, but as a well co-ordinated whole, are largely responsible for these results, and if continued will show even greater results for the future, which will mean an actual saving to taxpayers of several times its cost. Were there space we might tell you why we believe this to be true.

The dental division of the health department was established in September, 1918. At that time a survey of our school children in the grades showed that at least 85 per cent of them needed dental attention from the standpoint of fillings or extraction, and that 25 per cent of them had definite mouth infection—pus, filth and putrefaction oozing down their throats twenty-four hours of the day. The small number that had received any adequate dental attention was almost negligible and the task ahead seemed somewhat staggering.

With the splendid co-operation of school board, city council, teachers, nurses and local dentists, those figures have been materially changed, so that our last examination taken just three years later shows that the 85 per cent has been changed to 45 per cent for our entire school children in the grades, some 15,000, and mouth infection and decay of permanent teeth has been reduced more than half. Many rooms in our schools have obtained certificates for having had all necessary fillings and extractions completed for each child and for daily use of tooth brush. In 1921 our city clinic alone completed all necessary fillings and extractions for about 5,000 different boys and girls. Great stress is laid upon the correction of the small pit and fissure defects, as we believe this is the greatest practical preventive measure

of all. On this account we always make our school examination each year with mirror and probe instead of tongue blade.

We depend entirely upon the school nurses to keep our dentists busy, each nurse being made responsible for definite time to send the required number of children to the clinic. Emergency cases can be sent at any time by the teacher or nurse. In this way the dentists are kept continuously busy with the least loss of time to the pupils. We have three chairs at the central clinic at the Health Center and three in or near outlying schools. Through an arrangement with the state we also care for the 300 pupils in the Michigan School for the Deaf located in Flint and with the help of our city nurses we do for the parochial schools of the city exactly the same as for the public schools and have accomplished in these just as great changes as in the public schools with the hearty appreciation and co-operation of those in authority. We also give the County Red Cross nurses one-half day a week in our central clinic for needy children from the country schools.

While our work is almost entirely and primarily for children we do at the central clinic extract to relieve pain or remove mouth infection affecting the general health of indigent adults. The improvement in health of some of these individuals after removal of infected teeth is sometimes marvelous. While only a very small part of our work this is of untold benefit to the individual and a saving to the city.

With our children we keep as far away as possible from any suggestion of our work as charity. We do not want the parents or children to think of it as such. We claim it is not charity any more than our free public schools are charity, but that it is on exactly the same basis. However inasmuch as we cannot care for all, those who can should have their work done outside and we leave it to the nurses to determine who are entitled to come to the clinic and who not. Surely it is of even greater importance to give our future citizens health as education. That it is having an educational effect as well, is evidenced by the increasing number of children going to private dentists each year since our work began.

Teachers, parents and others are enthusiastic over the results accomplished. Individual instances of pale, anaemic, sickly children out of school much of the time changed completely in a few months after taking care of bad mouth conditions into hearty, healthy, alert boys and girls with no more absences lends heart and enthusiasm for our task. School retardations alone have been reduced 50% since we started our health program, and absences from school reduced in a very marked degree.

Our task as we see it is twofold: education and correction. Education in matters of personal cleanliness, health habits and diet accomplished through the clinic, nurses, teachers, mother's clubs, press, etc., and correction as provided by the clinic and private dentists. We are trying to use all these means to the end of a stronger, healthier, happier race.

As a preventive measure in tooth defects we are satisfied that too much stress cannot be placed upon a sufficiency of milk and milk products and

leafy vegetables in the diet of the expectant mother and later in the child.

Just a word as to the effect of our program as to taxation, an important one today when economy is the watchword. Our entire dental program with five full-time dentists is costing the people of Flint less than five cents per \$1,000 of assessed valuation, so that no taxpayer would be able to recognize the difference if the entire program were wiped out. It amounts to about one dollar per school child in our grades, as compared to \$70 per child for education. In addition we believe we can consistently claim that the amount is more than saved to the taxpayers in the school efficiency of the pupil and lessened amount of sickness.

The funds necessary for the city health program are furnished partly through the city council and partly through the school board, the latter employing the school nurses and turning over to the city one-third of the funds necessary for the dental budget.

REPORT OF DENTAL DIVISION, FLINT HEALTH DEPARTMENT, FOR THE YEAR
ENDING DECEMBER 31ST, 1921.

Central Clinic (child):

Patients	5,328
Fillings	11,971
Completed cases	2,931
Deciduous teeth extracted	7,074
Permanent teeth extracted	1,002
Local anaesthetic given	1,995
General anaesthetic given	395

Central Clinic (adult):

Patients	711
Fillings	81
Permanent teeth extracted	1,905
Local anaesthetic given	201
General anaesthetic given	88

Parkland School Clinic (child):

Patients	1,850
Fillings	2,865
Completed cases	1,057
Deciduous teeth extracted	2,079
Permanent teeth extracted	358
Local anaesthetic given	933

Parkland School Clinic (adult):

Patients	11
Fillings	9
Permanent teeth extracted	8
Local anaesthetic given	3

St. John Clinic (child):

Patients	1,460
Fillings	3,649

Completed cases	826		
Deciduous teeth extracted	2,058		
Permanent teeth extracted	350		
Local anaesthetic given	641		
St. John Clinic (adult):			
Patients	29		
Fillings	2		
Permanent teeth extracted	42		
Local anaesthetic given	20		
M. S. D. Clinic (child):			
Patients	270		
Fillings	798		
Completed cases	154		
Deciduous teeth extracted	138		
Permanent teeth extracted	387		
Local anaesthetic given	140		
Lewis School Clinic (child):			
Patients	110		
Fillings	300		
Completed cases	57		
Deciduous teeth extracted	93		
Permanent teeth extracted	2		
Local anaesthetic given	36		
School Examinations	14,167		
	<i>Child</i>	<i>Adult</i>	<i>Total</i>
Number of Patients	9,018	751	9,769
Number of Fillings	19,783	92	19,875
Number of Completed cases	5,025		5,025
Number of Deciduous teeth extracted.....	11,691		11,691
Number of Permanent teeth extracted.....	1,850	1,955	3,805
Local anaesthetic given	3,745	224	3,969
General anaesthetic given	395	88	483

DENTAL EXAMINATIONS 1921

	Total Exam.	Percentage Defects	Percentage Defects as to Schools
Nurse			
E. M. Dickson...	2216	40%	Parkland 37%, Belleview Sub. Gardens-Meringo 54%, Dewey 40%.
M. Jadwin	1441	40%	Fenton Road, 36%, Oak 41%, Walker 43%.
G. Manley	1279	41%	Lincoln 42%, Crego-Elm Park 43%, 8th St. Fresh Air 40%, Clark 39%.
M. Chayer	1586	42%	Fairview 42%, Bickford-Delaware-Lewis 41%, Water Works 44%.
F. Secrest	1672	45%	Kearsley 50%, Homedale 45%, Missouri 50%, Rankin 36%.

M. Schuster	2055	47%	Doyle 52%, Civic Park 46%, Cook 44%.
S. Geuss	1462	47%	Hazelton 45%, Corunna Rd. 35%, Third Ave. 57%, Stevenson 50%.
F. Burghdorf . .	879	48%	Dort 48%.
Parochial	1313	47%	St. Mathew's 36%, All Saints 56%, and St. Michael's 47%.
M. S. D.	264	55%	
Total	14167	45%	

By defects we mean children who need fillings or extraction or if very dirty and no other defects—cleaning. This includes all our kindergartens and first eight grades in the city. This examination was made during September, October, November and December, 1921. The same examinations of kindergarten and first eight grades made when we started the work in 1918 showed 85% defective on this same basis. Our county schools, in which two Red Cross nurses are now on the third year, will show equally as good results. Because of support rendered city and equipment furnished the Health Department by the Red Cross we give these nurses one-half day a week in our Central Dental Clinic.

It is true always and everywhere that an ounce of thrift and hard work is worth a great many pounds of envy of some one else.

INDIRECT INLAYS

BY HORACE VAN VALKENBURG, D.D.S., CLEVELAND, OHIO

INLAYS ARE GOOD ONLY in proportion to the perfection of every detail, viz.: Margins, occlusion, contact point, cavity form, which must embody form for retention, extension for prevention, and resistance to the stress of mastication.

How to best obtain a perfect inlay, providing cavity preparation has been properly made—we will assume that our cavity is prepared, giving us our resistance, proper cavo-surface angle, etc.

It hardly seems logical that with a material as frail and unresisting as inlay wax that we are able to make a perfect pattern of our cavity, trim same properly at the gingival, remove from the tooth under the difficulties we encounter in the mouth, especially in M.O.D. or D.O. cavities, and expect a very high percentage of perfection by the direct method.

The writer has been using the indirect method for some time in all posterior inlays except the very simple occlusal cavities, and the slight extra time used in making the model and articulating same is easily over-balanced by the time saved in setting the inlay when finished, as practically all the finishing can be done in the laboratory and more accurately, to a metal model which can be held in the hand, than to a tooth, in some inaccessible part of the mouth.

The impression is taken with Kerr's modeling compound cones, using a loose-fitting copper matrix which is to force the material to close contact with the tooth at the gingival, taking the impression of the greater part of the tooth. If not the whole tooth enough to carry the compound well back from the margins of the cavity. With the saliva ejector in place, chill the impression well with water, remove and see that all margins are clear and distinct, that the impression material is not distorted in withdrawal.

Next take a mush bite, using pink base plate wax, insert temporary filling and dismiss patient.

In making the amalgam model the operator has his choice of several good alloys for models, which are less expensive and more suitable than regular filling alloy. Mix more plastic than for filling, pack impression, using usual instruments for working amalgam, leave the amalgam model to set over night.

The next morning separate and place amalgam model in wax bite, pour model and articulation with good model plaster.

After model and articulation are separated, take good inlay wax, force into cavity in amalgam model, bite articulator together, remove amalgam model and carve inlay, using care to preserve the proximal contact and marginal ridge.

Carve sulci, observing the direction of stress of mastication. As a final polish we use silk; ordinary silk cloth cut into strips to polish wax.

Invest and cast in whatever manner the operator gets the best results. The discussion one hears about the shrinkage of investments and gold, casting at certain prescribed temperatures, and with a certain casting machine is all a matter of technic with certain operators.

The writer remembers attending a dental meeting and hearing one learned speaker talk of casting inlays in cold molds, burning the wax at certain temperatures, etc. Returned to the office and consistently spoiled the first three inlays he tried by said method.

Use the methods of casting you are accustomed to and use them consistently. If you cast with a vacuum machine, an air pressure machine or a centrifugal machine you will get results providing your wax pattern is absolutely correct at the start. The method in which the molten gold gets into the mold is secondary.

The item of primary importance is that the gold *does* get *into* the mold and fills every space left by the burning out of the wax pattern.

After inlay is cast, fit in amalgam model and polish, and if the technic is correct it will result in a beautiful restoration of the lost portion of the tooth.

709 The Arcade.

The concluding installment of Dr. Barnard Feldman's able contribution to the science of anesthesia is unavoidably omitted from this issue. It will appear in July.

PENETOLOGY

Conducted by WILLIAM A. LURIE, M. D.
1130 MAISON BLANCHE BUILDING
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This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

Interpretation of the penetogram and the explanation of the many lines and shadows as they appear, as to their meaning in relative anatomic normality or pathology, is a most important matter. It is likewise a difficult one. Difficult because of the lack of understanding that exists in the interpretation of the picture and the association the changes to be noted might have with an abnormality or with a pathological condition. The reason for this difficulty is very likely the fact that up to the present there has been a greater interest centered in the making and taking of the picture than in the reading of it. This is again shown in the great improvement that has taken place in X-ray machines, the films, their holders, and even in the attempt by all to produce good pictures.

The next step is the reading of the pictures. The importance of this point is growing apace. Picturing is improving, and likewise becoming standardized. While the greatest steps have been taken in the attempted production of good pictures, the great work of standardizing shadows, their classification and the determination of their meaning is going ahead in a definite manner.

In previous papers such a classification was undertaken. This classification is based on the assumption that the expression of the degree of light-penetration pictures a normal or abnormal appearance for any given, definite, or fixed anatomical entity.

To be more particular and to repeat in part: the soft tissues about the jaws resemble the soft tissue found anywhere about the body, and the resistance to X-ray penetration of this tissue is very little. This tissue in itself has not sufficient variation in atomic density to picture a definitely distinct difference in tissue structure except in greater masses than such as do exist about the mouth. The resistance is slight, therefore the line of demarcation of where space and soft tissue meet is difficult of determining. This grade of tissue forms shadow which has been classed as Grade 1. In the mouth and about the jaws this grade of shadow can be seen normally as the gingival tissues, the periodontal membrane about the teeth, and in the interspaces between the bone partitions of the lacunae or bone spaces which compose the Haversian canals of alveolar bone. Alveolar bone has not

the atomic density, per mass, that compact bone has. It is therefore less resistant to X-ray penetration than dense bone of equal mass. This difference has permitted the division of bone shadow, which has been graded as Grade 2 and subdivided into an A and B division. The A of Grade 2 represents alveolar bone, which, because of the presence of its canals having a definite amount of soft tissue, assumes a definitely mottled appearance, while the B of Grade 2 shadow is in representation a bone mass of a denser nature, without the finer structural appearance as can be noted in alveolar bone.

A third class, Grade 3, is also defined, in which are all foreign substances of the types of minerals used in treatment and metals in replacements, all of which have a greater atomic density than tissue or bone.

Now to apply the classification to the interpretation of pictures for the understanding of such pictures as the expression of normal or abnormal appearance of parts.

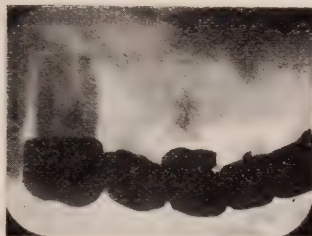
The relative anatomical appearance of teeth, their size and shapes; are known. Their size and shape as pictured in the normal position and from a variety of angles should be known. However, a tooth is expressed in shadow of Grade 2b except for its pulp chamber and root canal, which is expressed in shadow of Grade 1. If the tooth being examined were pictured in a manner described in a previous number of THE DENTAL SUMMARY, that tooth, be it of the upper or the lower set, molar, pre-molar, bicuspid or incisor, would have a definite and typical appearance through which its recognition should be possible. Its shape would be typical. These statements are as true as is the normal anatomical appearance of any tooth. From the appearance, therefore, of the shape the shadow of Grade 2b assumes, a definite tooth is determined or pictured to the mind. Should there be any alteration in the outline of that tooth, it is at once brought to our attention. Any alteration in outline would be noted in the line of demarcation separating the tooth structure from the surrounding tissue. If such an irregularity were because of a greater extent of Grade 2b shadow, it is obvious that dense bone structure has been added. If the irregularity were due to a loss of shadow of the type of Grade 2b and an increase in that of Grade 1, the loss of Grade 2b shadow would have to be explained. If it were replaced by shadow of Grade 3 or even if tooth-length were replaced by shadow of Grade 2a, it requires explanation. Such various alterations may find their explanation in the formation of hypercementosis, degeneration, apical absorption and infection, root amputation, tooth devitalization, or replacement of any nature. The explanation of its expression of any one of the mentioned and numbers of unmentioned conditions, is determined, however, through a knowledge and a determination of just how extensive any grade of shadow is and if its extent is normal. The replacement of one grade of shadow by that of another is the point to be explained. Such an explanation often carries with it the determination of the character of the process that is being studied.

If caries attacks a tooth, the Grade 2b shadow is replaced by Grade 1. If such a process is on the distal surface of a tooth, it will be the distal outline that will be found broken, irregular and replaced in part by the foreign shadow. If the carious area be on the buccal or the lingual surface, depending on its extent, the intensity of Grade 3 shadow will be diminished and approach the Grade 1 type in direct relation. That is to say that if there is a small process the variation will be slight, whereas if the process is extensive a well defined area may be pictured. Another point can well be made at this time relative to the location of caries in teeth, and it is equally true of the recognition of position of any factor or condition one may care to study, and that is the fact that if the process occupies a position nearer the buccal surface it will not be as clearly outlined nor show as marked a change as a similar process situated to the buccal side of a tooth would show. To reiterate, the line of demarcation or limitation of the extent of a process is more clear and distinct if that process is situated lingually in contra-distinction to a similar process situated buccally.

It is practically an impossibility to reproduce a picture in print with all the details that could be shown or described in a good film. However from time to time such illustrations will be attempted, and, if successful, will be distinctly pointed out. The reading of pictures by the shadow-grade method will be explained in this issue from the three following illustration:



A.



B.



C.

Let us consider illustration A, and in this picture confine our attention for the present to the molar to the farthest left, the first molar in this case. The tooth is well outlined. The crown margins appear unbroken mesially, while distally, immediately above the point where the gingival margin can be made out, there can be noted a projection from the surface of the tooth much like a spur. The crown of the tooth is outlined in shadow of Grade 2b and it will be noted that the projection registers a resistance equally as great as tooth substance. It must therefore be something of equal atomic density compared with tooth substance. This shadow has not lessened the resistance of tooth substance to X-ray penetration as described under caries but has disturbed the straight line that the shadow of the plane of the distal surface of the tooth should present normally. This shadow represents a bit of calcareous deposit on that surface of the tooth.

Note the difference in appearance in either molar of that portion of

the crown which has been filled. The greater resistance to penetration is clearly pictured. The filling is shadow of Grade 3. Note its darker shade. (These pictures are positive prints, therefore the greater the resistance to light penetration the darker the area. This is the opposite of what is noted in a negative.) Just under these fillings in either molar can be seen an area of lighter color or shade. This area assumes the anatomic shape and position of a pulp-chamber. As the pulp chamber contains soft tissue of low atomic density, it has detracted from the resistance to penetration that the crown of the tooth represented in a mass of greater atomic density to the extent of its mass area, therefore the lighter appearance. Compare the appearance of the shadow of the pulp chamber with that of alveolar tissue. It is lighter. Compare it with the appearance of the gingival shadow to be seen between the two molars. It approaches it closely in type and shade. It is shadow of Grade 1. The shadow of soft tissue. This same type of shadow is normally to be seen in root-canals and can be distinctly seen in the distal root of the first molar.

Now let us focus our attention on the last molar for the purpose of ascertaining a nearly normal appearance of the roots of these teeth, and then compare the appearance of these roots with those of the first molar. Immediately the great difference in size is apparent. Studying this appearance in grades of shadow it will be noted that such enlargement as is pictured has apparently taken place in a regular manner throughout the roots and the root contour is smooth and even. The appearance of a *lamina dura* in the alveolar process mesially to the mesial root can be made out. The anatomical disturbance or difference to be noted can be recognized as existing entirely in a greater extent of Grade 2b shadow and as a continuation of the crown portion of the roots. This is a representation of hypercementosed roots.

Now note the appearance of the alveolar shadow (Grade 2a) mesially to the last molar. Compare the height of the shadow in this position with that mesial to the first molar. There is some shadow of the grade and intensity of resistance of alveolar tissue (Grade 2a) missing and in its place can be seen shadow approaching that of type of Grade 1 of soft tissue.

Considering picture B we note that there are but two positions in which the alveolar shadow (Grade 2a) is interrupted by shadow of Grade 2b. One is the molar abutment to the bridge and the other the portion of root under the bridge in about the center of the picture. Looking closely at the molar we note that the alveolar shadow (Grade 2a) is lost in great proportion about the molar. The lost shadow is replaced by Grade 1 or soft tissue. No shadow of the type of tooth structure seems to have taken part in the substitution. The outline of the molar roots appears anatomically correct. The existing condition therefore represents a loss of Grade 2a shadow and a replacement with Grade 1, which means that there is an increase in soft tissue. Referring to the piece of root in the middle of the picture it will be noted that the shadow of Grade 2b (which denotes the

root) shows no continuity with the shadow of Grade 3 (the bridge) to which it was evidently an abutment. This is again borne out by the fact that Grade 1 shadow can be detected between the appearance of the root and that representing the gold of the bridge. Further study of the bridge in Grade 3 shadow shows that at the point near the tooth root the appearance of the construction varies from that to be seen to either side and gives the impression that at that point the bridge met the root. Note the irregularity in shadow of Grade 3.

Referring now to picture C, and particularly to the first premolar in this picture, the tooth with the distal inlay and root canal filling. Note that the margin of the filling and the distal plane of the tooth do not picture an anatomically correct condition. There is a distinct step between the margin of the filling and the root of the tooth. Now study the root canal filling. Grade 3 shadow does not replace Grade 1 to its full extent, which anatomically should be to the apex, and neither does it fill the canal as entirely as it should. Grade 1 shadow can be distinctly noted mesially in the middle third of the root. Periapically there is a loss of alveolar shadow (Grade 2a) and Grade 1 substituted.

These differences have all been particularly recounted to impress the reader that the rule of the application of shadow-grade aids in the interpretation of a picture. Through such interpretation a diagnosis can be more easily arrived at, because it is possible to understand what the process is that has taken place. The association of such findings with the pathology which underlies such conditions completes a diagnosis. *The rule then, is: study a grade of shadow and its anatomical extent and then explain the changes to be noted by their character in relation to shadow grade.*

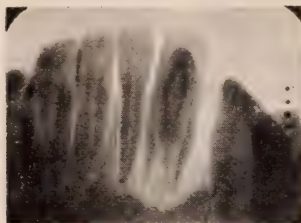
CASE HISTORY

This rather unusual case occurred in the author's practice.

Boy, W. M., 9 years old, was brought to the office by his mother to ascertain the reason for the difference in appearance of the right lower lateral incisor, when compared with the neighboring teeth.

Examination of the tooth in question showed an incisal edge about twice as broad as the neighboring central incisor and having a labi-lingual depth about one and a half times that of the corresponding tooth on the opposite side. The labial surface of the tooth was broader and did not have the contour of the other incisors. On the lingual surface there was a distinct and pointed cusp to be noted. The gingival margin was very swollen, red, and about the depth of the apex of the tooth there was a distinct and discharging sinus through the gingival tissue. The tooth was not painful to percussion, though the mother said it had been at times. It was slightly loose in the socket, compared to its opposite. A penetrogram was made and disclosed a condition as shown in the illustration. (Note the difference in shape and size of this tooth over a normal lateral incisor, also

the widely opened apex and the appearance within this tooth shadow of an area of greater resistance assuming a shape similar to a tooth.)



The removal of this tooth was advised but was refused. After a year the case presented itself again and the tooth was removed and it is here illustrated. Note the appearance as described and the apex of a tooth within the lumen of the root canal. This is evidently a supernumerary tooth with the root canal of the permanent lateral incisor.



PENETOIZED PARAGRAPHS

The best of instruments in the hands of the unlearned are useless. It is the skilled workman who can use them to advantage and he can do even creditable work with even the roughest or crudest tools. Dentistry has always enjoyed delicate tools and good instruments. It has been a privilege of many to try their hand at the use of them. Many have used them well. Few, however, have become signal leaders among them. Now all must turn their hands and attention to a newer instrument—the X-ray machine and picture. Dentistry must now apply what it has learned to the use of this instrument and its possibilities to the utmost of its capacity. In so doing there are many new things to learn,—and there are many things which have been learned long ago which now have a new light shed on them (in more ways than one), and which today are different than they were yesterday. The adoption of the newer instrument, an instrument of precision (and here again the meaning is twofold) has suddenly become popular in the hands of the dental profession. The necessity for the use of the X-ray machine in dentistry has come like a tidal wave and swept the enlightened world. The manufacturers of machines tell us that the top of the wave has not yet broken. The profession is fighting the force of this wave. It is

trying to stem the tide of damage coming from the unbridled knowledge unfolded by the dental penetogram. Yes, the knowledge of what is shown in the dental penetogram and to what use such knowledge might be put, is unbridled. Why has there been little or no attempt to harness the beast, or whatever one wants to call it?

In the dental schools of today courses on the subject of X-ray are of minor importance, and only claims the attention of the already over-busy student because of the additional mechanism which might, should or must be added to the equipment of a dental office. Teaching interest is centered in the control of the apparatus and its manipulation and the proper development of pictures. These are all necessary. They are vital to the raising of the standard of the character of the picture which is produced. In a comparatively few moments, at the time a machine is purchased, the layman who installs the machine or the salesman who sold it, can teach these details to the purchaser. Any one familiar with the development of kodak pictures, and the Eastman people have made dark-room technic easy, is competent to do dark-room work of the nature required in dental penetography. These remarks are not made because of criticism of the courses on the subject in dental colleges, but because of the fact that the colleges are not riding the crest of the wave of this subject but are still in the trough ahead and beneath it, and far indeed from reaching or alleviating what damage is being done daily.

Riding the crest of a wave is a dangerous thing to do. The wave-crest does not remain long. The riding of the crest is only a matter of opinion, and opinions do change. The struggle for supremacy is most often a personal one and not always guided by a desire for the greatest good for the greatest numbers. And here like elsewhere the greatest pressure and force is exerted by him on top. And he on top does not always have the power of unbiased discrimination of what is good and what is bad. And he on top is often selfish and afraid to broadcast his knowledge because of a fear for his own aggrandizement. There is a situation in dentistry today in which the human family has been the actor from time immemorial. And we are dealing with humans and their troubles. That situation is the one facing dentistry today, brought about by the wave of education, started by the X-ray machine. Dentistry must learn X-ray. Not how to use the more or less cumbersome machine and to take pictures. Not that alone. It must learn to use the finer tool, the picture.

In the learning of what a picture is worth we come to a realization of the real force of the wave, the depth of its trough and the wreckage in its wake. We are guided in the greatest percentage of instances by the voices and the directions of those on the crest. We must assume that our teachings from those in a position to do so are correct. The determination of whether they are or are not is not always to be judged by the cries heard in the

wake of a movement—from those not in accord with progress. Commendation is only whispered while condemnation is always shouted.

The movement of progress in X-ray of today does not come and cannot come from the workers who top the wave. What ability they have in such as has been more or less hastily corralled and gleamed from the antiquated ideas of the subject when dentistry was an art unto itself. Like the newer dentistry of today, there is the newer knowledge of the penetrogram, and it does not all come from the top, like the cream on the milk bottle. There is much food for thought and much which is useful in the trough of this wave just as there is much value to milk without cream. We are prone in our day to use the cream and spill the milk.

There are today some forty thousand dental practitioners and about four times as many members of the medical fraternity, a vast majority of whom are not conversant with the reading of the findings of an X-ray picture or penetrogram. Yet the findings of a penetrogram are very important and one of the greatest aids in the determination of any condition or even as a determining factor in any line of treatment. The minority in both dentistry and in medicine never avail themselves of the advantages of post-graduate instruction. Now here comes the rub. Any instruction on the subject of X-ray or Penetology which has been offered has originated with the machine manufacturers, and in great part has been naught but mechanical in the taking and making of pictures. The majority who ride the wave crest today have been occupied in perfecting the manual and technical part of the operation of picture taking. That is only one part of the use of the tool which has been put in our hands. The other part is the knowledge of what use can be made of the portrayals we get by the application of our mechanical aptness of today.

The world's progress depends upon teaching. Teaching depends upon the teacher. The faster a teacher progresses in his knowledge of his subject the more rapidly and the more ably can he teach. What good, however, is there in being good teachers, when the places in the organized schools (the wave crests) are filled and with those of the older classes who have but mastered the mechanical fundamentals? They leave no room for the younger, perhaps the progressive, to display their knowledge or to express their individuality. In olden days when travel was difficult, when news was carried by the wanderer, he was a teacher. Travel is easier today and we travel long distances to learn. Yes, we might travel halfway or more across a continent or even the face of the earth to be able to say we have been taught by some favorite teacher; but the majority of us are laggards. Once we have been taught we sit contentedly on our pedestal of faith and wait. As time passes we do not travel again to our Alma Mater, nor do we continue the learning as we should. ("We," in this instance, refers to the majority in either profession.) Teaching is too hard for us to reach and too inconvenient. We therefore are forced, if we seek knowledge from the outer

world, the world not governed by those riding the crest of the wave of time, we must get our knowledge from the "Wanderer." Many a wanderer has knowledge not gleaned from older teachers. The value of his knowledge lies in its originality. All things, because they are universally practised, are not always and inflexibly right.

Because of the fear that the Wanderer-teacher may disclose an idea or principle not in keeping with organized teachings and thought, his regulation is suggested. It is a possibility. It should be done for the common good. But how? It is proposed that the itinerant teachers appear before a Board of Dental Examiners and be passed on, as to their ability. A commendable suggestion worthy of profound consideration and no doubt should be adopted; but—how does it apply to the subject of X-ray or penetology, or an allied advanced step, one in which the ordinary Board of Examiners themselves are not competent nor in which they have organized any definite examination, a new department in which their own personal views may not be broad enough to grasp or permit of a complete and comprehensive understanding of the ideas of the one who is being examined? Such a situation is possible of existence. It does exist and today is governed by those who ride the wave crest. It is responsible for much of the slow progress in some of the newer branches or ideas which permeate any profession. It may be the proper course, but in the instance of the penetogram, the woeful lack of knowledge of what can be seen and what it represents is directly due to a lack of teachers and a common or even a standard in teaching or in knowledge.

The major portion of the profession are without instruction. They do not seek it because of the chaotic situation. By the time that the leader of today has spoken, the thoughts he expresses are obsolete because of their simplicity in tomorrow's light. The leader of tomorrow in penetology, who will pass the man of today has not yet presented himself. His coming, however, is only a matter of time. He will come, and he will be a wanderer, "A Stranger Among Us."

Competency is the weapon of competition. The dentist who wishes to compete with the lay X-ray laboratory must not only take good pictures, but HE MUST KNOW HOW TO READ THEM. That is the point. The layman is incapable of competing relative to anatomy and pathology which constitute the diagnostic part of the work—but the dear public does not appreciate that. They do not feel that they should pay for it—but they should. They must be made to realize that the diagnosis for which they pay nothing to the laboratory is worth JUST THAT MUCH. The public does not understand the dual situation as it exists relative to that branch of X-ray and the profession. It does not understand that the taking of a picture and its finishing by development and fixing is a me-

chanical effort which can be mastered by a layman who can be taught to recognize an electric switch and the manipulation of it and one who can learn the reading of an ammeter. The public does not understand that the translation of the lines and shadows which the taking of a picture produces is not so easily learned. It does not understand that the learning of a profession and its practice is not a mechanical operation. When pictures are taken by the professional operator the public only recognizes the mechanical part of the operation. It is the only part they feel they should be asked to pay for, because pictures can be made—shot—or bought at a dollar per, at the laboratory. It is incumbent on the profession to teach the public. It always has been necessary to teach them. The X-ray situation is a new field in which they must be taught. The quickest and best way—in fact the only way to bring the public to the understanding that there is a professional side to the X-ray situation is through efficiency—competency on the part of the profession to fulfil that part of their duty to their patient—the public—by correctly understanding a penetogram if it be correctly taken. The laboratories as a rule take good pictures. They have it to do to continue in their business. The profession are regrettably behind in their ability to read the dental penetogram and the public appreciates the fact. The dentist should learn his part and do it as conscientiously as the layman does his part in the making of pictures. The public is ready and willing to pay the price. Yes, it means the understanding of your part first and then you can make the other fellow—your patient—the public—the victim of the X-ray shooting gallery—understand that the important part of the X-ray situation is the diagnosis and interpretation, which you know and understand. They are willing to pay the price for anything which is legitimately offered and which is properly understood.

The understanding of the dental penetogram is something which the lay laboratory operator knows nothing of. He can learn, and he does learn quickly enough, the reading of a picture as the expression of proper or improper penetration. His experience teaches him that. His initiative and his business acumen often control his sagacity as well as his veracity. He gets away with it because neither he nor his patron has any method of checking nor keeping record of the mistakes he makes nor why he makes them. The client of the laboratory feels that he has been fairly dealt with, because he has paid for a concrete and definite mechanical operation which required a definite amount of time, and some skill, as well as apparatus with which to work. The diagnosis—that part of the picture which is the most important to have correct—he gets for nothing—a sort of gift or gratuity. Human nature the world over is the same. Where people believe or are led to believe that they can get something for nothing, or where they are getting more than a hundred cents to the dollar, they feel they are getting the better for their money, be it in the stick of candy given the child by a druggist or grocer or the extra doughnut of a

baker's dozen. Barnum, of circus fame, was correct in his statement about fooling the public. They still continue to be fooled. Not so easily with circuses any more. That sport is too tame. They have gone into the gamble with their health and life at stake this time. They are willing to be fooled—they are being fooled. It is just a matter of how long they will continue to be fooled.

The public can only be fooled as long as they remain uneducated. This does not mean in this instance that the public must know all about a penetogram before it can fight against the vicious practice it is the victim of, today. It means, however, that the profession which has always been the public instructor, must draw the line more closely between that part of penetology which is purely the mechanical operation of the taking of pictures and that part of it which really vitally concerns health, life and happiness—the intelligent reading of the picture and the diagnosis of the case, the truly professional part. The difference between the mechanical part of the work which a layman can do and the highly specialized and technical part—the interpretation and diagnosis—must be clearly and definitely drawn. It is true that a trained professional man who cares to adapt himself to picture making can take better pictures than the one who shoots them only once in a while. If he does well at picture taking it may be to his advantage financially as well as in every manner to devote his entire time to such work to the exclusion of his other professional duties. Such a man deserves the support of the entire profession. With him many valuable consultations may be had, and much information can be learned from him which comes as the result of his experience with the power of light penetrations of the peneto-ray, and his general knowledge of histology and pathology and the anatomy of the parts, as well as the value of the records of cases which he keeps. The placing of the confidence in a professional man by the profession teaches the public to have the same confidence. From the professional man who takes pictures at a price comparable with the lay laboratory the public cannot get a diagnosis without paying for it, and most often the public pays and pays well for anything they know to be of value. Competency, therefore, in the diagnosis of the dental penetogram is the weapon of this competition. Learn to use it. The picture taking end of penetography is a mechanical bit of work, capable of being learned by a layman, the diagnosis or proper interpretation cannot. Be professional men. Stand by your learning and learn more about what you should know in a professional way and let the mechanical work be done by the mechanics.

There is a monumental work possible in the field of dental penetology in the matter of research. The X-ray field is still in its infancy. Its full power and worth and depth, other than that of portrayals has not yet been fathomed. The question of why abscessed teeth feel better after the exposure to the X-ray for the purpose of picture taking or why many areas

which have been found to be stubborn in healing after extraction, should heal more readily after taking a picture is a question to be considered. It opens up a new line of thought and a new avenue for dental research and treatment. In the medical world much has been accomplished in the treatment of a variety of medical conditions by the penetrating rays from an X-ray tube. There are appearing papers, from time to time, reporting the treatment of cases of pyorrhea alveolaris and of infection with the streptothrix of Vincent with the X-ray. The methods of application has not been reported though promised. It is something to be considered and to be experimented with carefully for the peneto-ray is a two edged sword and oftentimes capable of more damage than good.

SOCIETY ANNOUNCEMENTS

Pennsylvania State Board

The Pennsylvania Board of Dental Examiners will hold an examination for applicants for a license to practice dentistry, in Pittsburgh and Philadelphia on Wednesday, Thursday, Friday and Saturday, June 21, 22, 23 and 24.

The theoretical examinations will begin on Wednesday, June 21, and will be held in the Musical Fund Hall, 808 Locust Street, Philadelphia, and the College of Pharmacy Building, Pride and Bluff Streets, Pittsburgh.

The practical examinations will be held on Saturday, June 24, in the Evans Institute, 40th and Spruce Streets, Philadelphia, and the University of Pittsburgh, Pittsburgh. The operative work will start at 8:30 A. M. and the prosthetic work at 1:30 P. M.

A partial examination will be held for students who have finished the work of the second year in college, on Wednesday and Thursday, June 21 and 22, in the same places. No others except second year students are eligible for the partial examination.

An examination will also be held for dental hygienists on Thursday, Friday and Saturday, June 22, 23 and 24. Only hygienists who have four years high school preliminaries are eligible for this examination.

Application papers may be secured from the Department of Public Instruction, Harrisburg. Any further information may be secured from

ALEXANDER H. REYNOLDS, *Secretary*,
4630 Chester Avenue, Philadelphia.

The Georgia State

The meeting of the Georgia State Dental Society will be held in Atlanta, Ga., June 14, 15, 16, 1922, instead of in Augusta, Ga., that date, as previously announced.

G. A. MITCHELL, *Secretary*.

South Carolina State Board

The annual meeting of the South Carolina State Board of Dental Examiners will be held at the Jefferson Hotel, Columbia, S. C., beginning at nine o'clock Friday morning, July 9th, 1922.

Application blanks and further information may be obtained from

W. K. WALKER, *Secretary*,
Orangeburg, S. C.

Vermont State Board

The next meeting of the Vermont State Board of Dental Examiners, for the examination of candidates to practice in Vermont, will be held at the State House, Montpelier, June 26, 27, 28, 1922.

Candidates will present for registration and preliminaries at 10 A. M., Monday, the 26th.

To be eligible for examination a candidate must be (1) twenty-one years of age, (2) a graduate of a high school of the first class, (3) a graduate of a reputable dental college.

Applications must be in the hands of the Secretary not later than June 16th.

For further information and application blanks, address

HARRY F. HAMILTON, *Secretary*.

Newport, Vt.

Massachusetts State Board

There will be an examination held by the Massachusetts Board of Dental Examiners in Boston on June 26, 27, 28, 29, 30 and July 1. All applications for examination must be filed with the Secretary at least ten days before examination. For full particulars, application blanks, etc., address

J. N. CARRIERE, D.D.S., *Secretary*.

146 State House,
Boston, Massachusetts.

The American Society of Dental Radiographers

The annual meeting of the American Society of Dental Radiographers will be held at the Ambassador Hotel, Los Angeles, Calif., Wednesday and Thursday, July 19 and 20. The Program Committee has arranged for an interesting and scientific meeting. All those extremely interested in Dental Radiography are cordially invited to attend.

M. C. McKITTRICK, *President*,

I. O. O. F. Bldg., Indianapolis, Ind.

MARTIN DEWEY, *Secretary-Treasurer*,

501 Fifth Ave., New York, N. Y.

Tennessee State Board

The Tennessee Board of Dental Examiners will meet June 19, 1922, at 10:00 A. M. at V. U. Dental Department, Nashville, Tenn., for the purpose of examining all applicants (presenting proper credentials) who wish to secure license to practice Dentistry and Dental Hygiene. Applications and fees must be in hands of Secretary, ten days before meeting.

For application blanks, address, F. W. Meacham, Sec'y-Treas.,

911 Hamilton National Bank Bldg., Chattanooga, Tenn.

F. W. MEACHAM, *Sec'y-Treas.*

American Dental Library and Museum Association

The next annual meeting of the American Dental Library and Museum Association will be held Monday, July 17, at the Hotel Ambassador, Los Angeles, Calif.

The membership consists now of over forty dental libraries, and we trust that all dental institutions owning a library will join same.

In order for the Association to accomplish its purpose it will be necessary and an advantage to all dental libraries to be members. Any institution or individual interested in dental literature or history are eligible for membership.

B. W. WEINBERGER, *Secretary*,
40 East 41st Street, New York.

Shrine Dentists, Attention!

Dentists attending the "Shrine Convention" in San Francisco, June 12-15, after registering at "Shrine" headquarters will please register at the James W. Edwards Company Dental Depot, 323 Geary Street, San Francisco, as the "Shrine" dentists of San Francisco wish to meet you.

DR. ARTHUR M. FLOOD, *Chairman*.

DR. W. A. ATWOOD, *Vice-Chairman*.

Meeting of the National Alumni Chapter of the Psi Omega Fraternity

The National Alumni Chapter of the Psi Omega Fraternity will hold its next meeting on Monday, July 17, 1922, at the Clark Hotel, Los Angeles, Calif. The Chapter will be called to order at 10 a. m. There will also be an afternoon meeting and an informal banquet at 8 p. m. at the Los Angeles Athletic Club, at which the Psi Omega ladies will be the guests of the Fraternity. A large attendance is desired. Every Psi Omega should register immediately on arrival in Los Angeles. Headquarters will be maintained during the national meeting at both the Ambassador and Clark Hotels.

MAX WASSMANN, JR., *Grandmaster National Alumni Chapter*.

Alabama State Board

The Board of Dental Examiners of Alabama will meet Monday, June 19, 1922, at 9 o'clock a. m., at the Birmingham Dental College, Avenue F and 20th St., Birmingham, Ala., for the purpose of examining applicants who hold diplomas from reputable dental colleges, for certificate of qualification to practice dentistry in Alabama.

All applications, accompanied by the examination fee, must be filed with the Secretary-Treasurer at least one week previous to the examination. For further information, application blanks, etc., address

H. CLAY HASSELL, *Secretary-Treasurer*,
616 22nd Ave., Tuscaloosa, Ala.

Arkansas State Board

The Arkansas State Board of Dental Examiners will hold its regular meeting for the purpose of examining applicants June 19-20-21, 1922, Hotel Marion, Little Rock, Arkansas.

Applications may be secured by addressing the Secretary.

DR. H. J. CRUME,
Wilson Bldg., El Dorado, Arkansas.

Delta Sigma Delta Fraternity

The thirty-eighth annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Alexandria Hotel, Los Angeles, Calif., on Monday, July 17, 1922, at 9:30 a. m.

Those expecting to attend should promptly notify Dr. Frederick M. Hunt, 709 Walter P. Story Building, Los Angeles, Calif.

By order of the Supreme Chapter,

CHALMERS J. LYONS, *Supreme Grand Master*.
R. HAMILL D. SWING, *Supreme Scribe*.

Psi Omega Fraternity

Headquarters, Clark Hotel, Los Angeles. National Alumni Chapter meeting, Monday, July 17, 10:00 A. M., ballroom Clark Hotel. Annual banquet, Monday evening, Los Angeles Athletic Club.

A three day motor sightseeing trip, from San Francisco to Los Angeles, has been arranged for those routed that way. Make reservations for this wonderful 700 mile scenic drive by communicating with Dr. Frederick T. West, chairman Psi Omega Caravan Committee, 2509 Mission St., San Francisco.

South Dakota State Board

The next meeting of the South Dakota Board of Dental Examiners will be held at Sioux Falls, So. Dakota, commencing promptly at 1 p. m., Monday, June 26th, 1922. For further information and application blanks address

L. R. WALSTON, *Secretary*,
Redfield, So. Dakota.

LEGAL DEPARTMENT

CONDUCTED BY ELTON J. BUCKLEY, 643 LAND TITLE BUILDING. PHILADELPHIA, PA.

Labels Must Tell the Literal Truth.

The United States Supreme Court has just handed down another decision which is bound to have a widespread effect upon the statements to be made on the labels which are attached to all sorts of merchandise. There is a type of manufacturer who believes, and has acted upon that belief, that it makes no difference how many lies you tell in your label, if the man you sell to, i. e., the trade, knows they are lies. Ignoring the fact that the consumer, who will probably buy on the strength of the lying label, does not know the statements made on the label are lies.

The point of the Supreme Court's decision is that labels must tell the literal truth, and that the use of labels which make misrepresentations on goods that come into competition with correctly labeled goods, is unfair competition and can be forbidden by the Federal Trade Commission.

The case I am discussing was brought by the Federal Trade Commission against the Winsted Hosiery Co., of Connecticut, manufacturers of underwear, which it sold under the following descriptions: "Natural Merino," "Gray Wool," "Natural Wool," "Natural Worsted" and "Australian Wool." Although every one of these descriptions imports pure wool, none of the underwear sold under these labels was pure wool. The most of it contained only 10 per cent. of wool, and none of it contained a very high percentage of wool. As this was obviously fraudulent, the Federal Trade Commission brought an action on the theory that the practice was unfair competition, because it was allowing the partly cotton product, wrongly labeled as all wool and selling at a lower price, to compete with the honestly all wool product. After evidence was taken the Commission found the concern guilty, and ordered it to cease and desist. The Winsted Co. appealed to the United States Circuit Court of Appeals, which reversed the Federal Trade Commission, on the ground that while it might be a good thing to stop the use of the untrue labels complained of, the Federal Trade Commission had nothing to do with it. The Commission then appealed to the United States Supreme Court, which in turn reversed the Circuit Court. The Supreme Court holds that the labels are fraudulent, that the case is within the jurisdiction of the Federal Trade Commission, and that the use of untrue labels constitutes unfair competition.

The case is of very great importance, because it establishes the rule that labels must literally tell the truth, and that the excuse that "the trade knows all about it" is no ex-

cuse for violating the rule.

The decision is quite long, and I am able to reproduce only the following portions of it:

The findings here involved are clear, specific and comprehensive. * * * The word "wool" when used as an adjective means made of wool. The word "worsted" means a yarn or fabric made wholly of wool. A substantial part of the consuming public and also some buyers for *retailers and sales people*, understand the words used on defendants' labels to mean that the underwear is all wool. By means of the labels and brands of the Winsted Co. bearing such words, part of the public is misled into selling or into buying, as all wool, underwear which in fact is in large part cotton. And these brands and labels tend to aid and encourage the representations of unscrupulous retailers and their salesmen, who knowingly sell to their customers as all wool, underwear which is largely composed of cotton. * * * The Winsted Co.'s product labeled as above stated, is being sold in competition with all wool underwear and cotton-and-wool underwear.

* * * The labels in question are literally false. All are calculated to deceive and do in fact deceive a substantial portion of the purchasing public. That deception is due primarily to the words on the labels, and not to deliberate deception by the retailer from whom the customer purchases. * * * Even buyers or retailers and sales people, are found to have been misled. The facts show that it is to the interest of the public that a proceeding to stop the practice be brought. And they show also that the practice constitutes an unfair method of competition as against manufacturers of all wool underwear and as against manufacturers of mixed wool and cotton underwear who brand their products truthfully. For when misbranded goods attract customers by reason of the fraud which they perpetrate, trade is diverted from the producer of truthfully marked goods.

The fact that misrepresentation and misdescription have become so common in the underwear trade that most dealers no longer accept labels at their face value does not prevent their use being an unfair method of competition. A method inherently unfair does not cease to be so because those competed against have become aware of the wrongful practice. *Nor does it cease to be unfair because the falsity of the manufacturer's representa-*

tion has become so well known to the trade that dealers, as distinguished from consumers, are no longer deceived. The honest manufacturer's business may suffer, not merely through a competitor's deceiving his direct customer, the retailer, but also through a competitor's putting into the hands of the retailer an unlawful instrument which enables the retailer to increase his own sales of the dishonest goods, thereby lessening the market for the honest product. That a person is a wrongdoer who so furnishes another with the means of consummating a fraud has long been part of the law of unfair competition.

Of course the rule laid down above is the only sensible rule to make. No label has the right to lie about the goods it covers, even if there is a chance that only one person may be deceived by it. This decision will have less effect on the labels used in food trades than on any other line, because the food trades have their food laws which have pretty generally eliminated untrue labels. In other lines where there are no "pure" laws, however, the decision will have a prolonged effect.

*Copyright, May, 1922, by Elton J. Buckley,
Esq., 643 Land Title Building, Philadelphia, Pa.*

*You might as well try to put out
a fire by putting a new roof on a
burning building as to "Cure" Pyor-
rhea by treating mouth conditions
only when the system is loaded with
acid toxins.*

OBITUARY

Dr. George H. Wilson

Dr. George H. Wilson was born at Painesville, Ohio, March 3, 1855, and died at Cleveland, Ohio, April 12, 1922.

He began practice with his father in Painesville in 1874 and proceeded from there to Ann Arbor for the years 1876-7 and 1877-8, graduating in the spring of 1878.

Following his graduation he returned to Painesville and practiced there until 1891. In the autumn of this year he moved his office to Cleveland, where he entered on his specialty of Prosthetics, in which he gained national prominence and respect.

It was also in Cleveland that he began his career as a teacher, being connected with the Homeopathic school during 1891 and leaving this school to become affiliated with the Dental Department of Western Reserve University when it was organized in 1892, and retaining this affiliation until 1906.

In 1911 his text-book, "Manual of Dental Prosthetics," first appeared. The reception accorded this authoritative work is evidenced by the fact that the fourth edition was required in 1920.

In 1918 he was presented with the Jarvis Medal, and in 1921 he was elected a Fellow of the American College of Dentists. He was also the permanent Honorary President of the recently organized Society of Denture Prosthetists.

During the latter years of his life he was associated with the University of Southern California, dividing his time between Los Angeles and Cleveland.

He was married in Painesville January 1, 1880, to Kittie Cooley, and two children, Dr. Harris R. C. and Paul L., survive.

In the passing of Dr. Wilson the dental profession has lost a scientist, a scholar, an author and a teacher; many members of the profession have lost a friend, and society at large has lost a gentleman. To those who knew him best these attributes were constantly present. His devotion to his profession was most noteworthy and his contributions to its literature will link his name with those who have done most for its advancement.

To attempt to eulogize him to his friends is futile. Kind, gentle, firm, courteous, generous, fearless—so he lived and so he died.

To have but known him is a rich inheritance.

RESOLUTIONS ADOPTED BY THE FACULTY OF THE DENTAL COLLEGE, W. R. U.

The faculty of the Dental College of the Western Reserve University, having learned of the sudden passing away of Emeritus Professor George H. Wilson, on April 12, desire to express its great loss and sympathy. Be it therefore

Resolved, That the death of Professor Wilson having occurred at the zenith of his great professional career, and with much work in preparation, his untimely demise has been a distinct loss to the Dental Profession.

Furthermore, The Western Reserve University owes much to his efforts and assistance toward the founding of the Dental College in 1892, and his continuous service as Professor of Prosthesis and Metallurgy over 12 years. Subsequently, as Emeritus Professor, he lectured and gave freely of his knowledge and advice.

As a friend of the College and its students, the University suffers an irreparable loss.

Finally, It is the will and order of the faculty that these resolutions, with our sincerest sympathy, be sent to the family of the deceased, spread upon the minutes, and published in the dental journals.

W. H. WHITSLAR,

F. M. CASTO,

F. C. WAITE,

Committee.

RESOLUTIONS ADOPTED BY THE INDIANA STATE DENTAL ASSOCIATION, IN ANNUAL SESSION AT INDIANAPOLIS, MAY 16, 1922.

Whereas: We have heard with deep regret of the death of Dr. George H. Wilson which occurred on April 12, 1922. Be it,

Resolved: By the Indiana State Dental Association in Annual Session assembled that in the passing of Doctor Wilson the dental profession has suffered a distinct loss in that he was one of those rare men who by nature was an investigator, student and teacher, and endowed with a thorough unselfishness in giving his knowledge to others without stint or limit; and be it further

Resolved: That this Association recognizes that to him it owes as much as, if not more than, to any other man the inception and development of the movement toward a more perfect technic in denture prosthesis; and be it further

Resolved: That these resolutions be spread upon the minutes of this Association, that a copy properly engrossed be sent to the family of Doctor Wilson, and that a copy be forwarded to THE DENTAL SUMMARY for publication.

A. J. KIMM,

Secretary

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

The fifty-fifth annual meeting of the Tennessee State Dental Association, held at Memphis, May 8 to 11, has passed into history as one of the best, if not the very best, convention ever held by the association, one of which the officers and committees have good reason to be very proud. The attendance was large, the interest most satisfactory, and the arrangements for and conduct of the meeting left nothing to be desired.

The president, Dr. George L. Powers, Memphis, was an ideal presiding officer, while Dr. Justin D. Towner, chairman of program committee; Dr. J. F. Bigger, chairman of committee on local arrangements, ably assisted by Drs. Logue, Baldwin, Ogden, Scharff, Brooks and all the rest, handled the details of the big meeting with the precision and smoothness of veterans on parade.

Two prominent factors in the pleasing success of the convention were: The appointment of a general committee to take charge of the program and clinics, assigning to each some definite work. On this committee Dr. J. F. Biggers was general chairman, with Dr. J. J. Ogden as assistant. Each clinic was under the management of a committee of two; and if any of them did not do their work to the queen's taste, their remissness was not visible to the naked eye. The other notably outstanding feature of great merit was the arrangement for the clinics. For the first time since my connection with dentistry those arrangements were satisfactory to me, and I have seen many a convention spoiled by lack of precisely the features so prominent at Memphis. Each clinic-room was fitted with a small amphitheatre, which avoided the usual crowding and neck-craning, allowing plenty of elbow-room for the clinician, ample arrangements for ventilation, and every facility. Several of the clinicians spoke to me about it, expressing their appreciation.

Dr. L. L. Sheffield, Toledo, and the writer were honored by being given prominent places on the program, which was long and varied, so chuck full of good things that some of the papers had necessarily to be abbreviated. Dr. Sheffield delivered a lantern-lecture and gave a series of clinics throughout the week on his specialty, "Denture Prosthesis." I handled two subjects, "Dental Economics" and that other hobby of mine, "Diet for Health, Comfort and Efficiency." Other papers and lectures were given by Drs. Jesse D. White and Arthur C. Engel, of St. Louis; Frederick A. Bricker, of the Rochester Dental Clinic; Robin Adair, Atlanta; Claude E. Hines, Memphis; Bowen K. Bowen, Nashville, and others,

all of which will appear in succeeding issues of THE DENTAL SUMMARY.

No account of the meeting, however brief, would be acceptable to anybody concerned without reference to the testimonial banquet tendered to Dr. L. G. Noel, of Vanderbilt University, at the Chisca Hotel, Tuesday evening, May 9, attended by at least the majority of those in attendance at the convention, with their wives and sweethearts, "present or accounted for," under the splendid management of Dr. C. J. Washington, toast-master par excellence. Following the dinner, many brief but highly eulogistic addresses were made to the honor-guest, Dr. Noel, who, at their close, responded by reading a brief outline history of the Tennessee Dental Association, from its inception to the present time, of which he himself has been an actively participating member for fifty years. The occasion was a most enjoyable one for all, but particularly for those who know how greatly Dr. Noel deserves anything that can be said or done in his honor.

Taking the convention by and large, it will be a long time before any of us who were there has the privilege of attending another equal to it.

State Laws to Be Enforced.

(Cleveland Plain Dealer, April 20, 1922)

A campaign to enforce state laws requiring dentists to have licenses was announced by officers of the state dental board last night following the conviction Tuesday of four Cleveland dentists on charges of violating these laws.

Dr. J. F. McDonagh, of Cleveland, president of the state dental board, and Dr. Ray R. Smith, of Columbus, secretary, appeared in court against the four. Those convicted were:

DR. JOHN COFIELD, E. 55th street and Broadway S. E., fined \$50 and costs for practicing without a license.

DR. C. C. WINFREY, E. 55th street and Broadway S. E., fined \$100 and costs for employing an unlicensed dentist.

DR. WILFRED E. JAMES, E. 93d street and Kinsman avenue S. E., fined \$100 and costs for employing an unlicensed dentist.

DR. ROY ANDREWS, E. 93d street and Kinsman avenue S. E., fined \$50 and costs for practicing without a license.

The suggestion by Mayor Thompson, Chicago, that a dental infirmary similar to the Forsythe, Boston, be built in that city, has met with enthusiastic endorsement on the part of the members of the great Chicago dental society, who have offered unlimited co-operation.

Have you any Scrap?

PRACTICE modern alchemy; transmute all scrap into precious metals required in your practice.

Anything, in any form, having a precious metal content, is grist to our mill. Old bridges, filings, crowns, contaminated metal, remnants of alloy mixes—pack it all up and send it to us.

And Do It Often!

We talk a lot these days about “overhead.” Here’s the way to take care of overhead. *We promise you a prompt and equitable return.*

THE PIONEER  THE LATE JOHN M. NEY	The J. M. NEY COMPANY FOUNDED IN 1812  President HARTFORD CONNECTICUT, U.S.A.	NEW GOLD FOR  OLD GOLD, SILVER PLATINUM ETC.
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Why My Patients Come Back.

For two or three years I have used this service plan with excellent results. It is an idea which is readily adaptable to many lines of business, even hardware, for example, and provides an automatic reminder exactly when needed.

I make out a duplicate file card, containing my patient's name and postal address, at the time any particular dental work is being done. One card I keep in the regular business file; the duplicate in a separate file, indexed by the months of the year.

For instance, a patient came in for dental work in December. The duplicate card, made out following the first visit, I placed under the month index for the month of June; that is, six months ahead. Towards the end of May, all the cards that have accumulated under the index for June will be taken out and the following printed card mailed to each individual:

"Dear Mr. Blank:

"Just a friendly reminder that you owe your teeth a visit to the dentist some time next month."

While no appeal is made for the business, not one person out of a hundred receiving this brief notice would even consider visiting any other dentist. Most of the recipients regard it as a personal favor to have the matter called to their attention at the proper time. The returns from these cards, by the way, have averaged between 80% and 90%.—*System, 1922.*

Johnson and Johnson announce the Cotto-Tooth-Brush, the latest addition to their dental list.

The Cotto-Tooth-Brush is designed for use by the patient as an adjunct to the bristle brush and floss silk in modern mouth hygiene, for the purpose of producing a high polish on the teeth without injury, enhancing their appearance and increasing their resistance to decay. Its use is also particularly indicated in cases of pyorrhea and tender bleeding gums. A fresh Cotto-Roll is used for each cleansing.

The Cotto-Tooth-Brush has received favorable comment from a number of prominent dentists, and has been mentioned as a valuable aid to the Dental Hygienist for use both at the chair and in bedside nursing.

The Cotto-Truth-Brush is being introduced through the dental profession and is on sale at the leading dental supply houses. The practitioner is therefore in a position to ethically recommend it, either supplying his patients himself, or referring them to his dealer.

Further particulars and literature may be obtained by addressing Johnson and Johnson, New Brunswick, New Jersey.

If you have not already received a copy of a booklet on "How Artificial Teeth Are Made," write to H. D. Justi & Son, 1301-3 Arch St., Philadelphia, and ask for a copy. It is one

of the most interesting pieces of printing issued by any of the dental manufacturing concerns for many years, and contains information that every dentist should have. As the basis for conversation during operations at the chair it would furnish far more interesting topics than are handed out as a rule. Few patients know anything about how their teeth are made. Why not tell them? It would certainly increase their respect for the profession.

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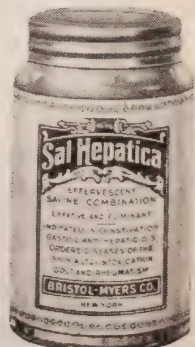
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Local Treatment

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Samples on Request

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NEW YORK





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*The Turning Point in
many Successful Practices
is associated with the visit
of a Trubyte Salesman*

THE successful salesman of today is the one who renders a service to his customer. That describes a Trubyte salesman perfectly. He is not a "one-sale" man. You may depend upon his desire to render a service which will benefit you. Upon his ability to do that depends his success.

Massachusetts State—President, William Rice, dean of Tufts Dental College; first vice-president, Frederick O. Kidd, Fall River; second vice-president, Leroy M. S. Minor, Boston; secretary, W. B. Ryder, Boston; assistant secretary, Frank H. Cushman, Boston; treasurer, Joseph T. Paul, Boston, and editor, Asher H. St. C. Chase, Boston.

Eastern Ohio—Frank P. Cook, Barnesville, president; J. K. Hunter, Bridgeport, recording secretary; A. F. Smith, Steubenville, corresponding secretary, and R. H. McNickle, Martins Ferry, treasurer.

Illinois State—Officers of the Illinois State Dental Society elected at session here were: J. H. Prothero, Chicago, president; Howard S. Layman, Springfield, vice-president, and A. C. Willman, of Kankakee, C. E. Duff, of Lawrenceville, H. A. Frankel and H. E. Smith, of Chicago, members of the executive council. The retiring president is Frederick B. Noyes, of Chicago.

Celebrating the golden anniversary of the entrance of Dr. Edmund Noyes and Thomas L. Gilmer, both of Chicago, into the society, nearly six hundred members of the organization participated in a banquet in their honor at the Leland Hotel the night of May 10.

Dr. Noyes and Dr. Gilmer, so Dr. Noyes stated in responding to the various talks in their honor, are two of three men who joined the society fifty years ago. Dr. W. G. McGill, of California, is the other pioneer of the group.

One significant feature of the banquet was the fact that Dr. Frederick B. Noyes, son of the guest of honor, is president of the society and presided. He is one of the leading dentists of Chicago, having followed his father in his profession.

Dr. Noyes and Dr. Gilmer have been friends for the last half century, drawn in contact by a common interest in teaching the rudiments of their profession to students of Chicago University.

Both men are well known among members of their profession throughout the United States by various papers and books which they have edited and published. Dr. Gilmer is perhaps better known than Dr. Noyes. His essay on "Fractures of the Inferior Maxilla," is regarded as one of the most authentic treatises on the subject.

Louisiana State—The forty-fourth annual convention of the Louisiana State Dental Society adjourned its three days' session at Shreveport, May 10, following the selection of New Orleans as the next place of meeting and the election of officers as follows: A. Walter Leabo, Shreveport, president; Dr. A. M. Joly, New Orleans, and Dr. J. S. Bernhard, Shreveport, vice-presidents; Dr. Fred Ratzeburg, Shreveport, secretary; Dr. O. J. Ory, Merryville, treasurer.

IPANA

TOOTH PASTE

Heals Bleeding Gums

—So thousands of dentists
have told us—

Recommending a tooth paste
that merely cleans the teeth is
easy.

Recommending one that just
tastes nice is likewise a simple task.

But to know and recommend
IPANA—that cleans the teeth thor-
oughly and without harm, that has
a smooth, snappy and delightful
flavor and Heals Bleeding Gums—
is a duty you owe to others.

*You and your patients
should know and use
IPANA.*

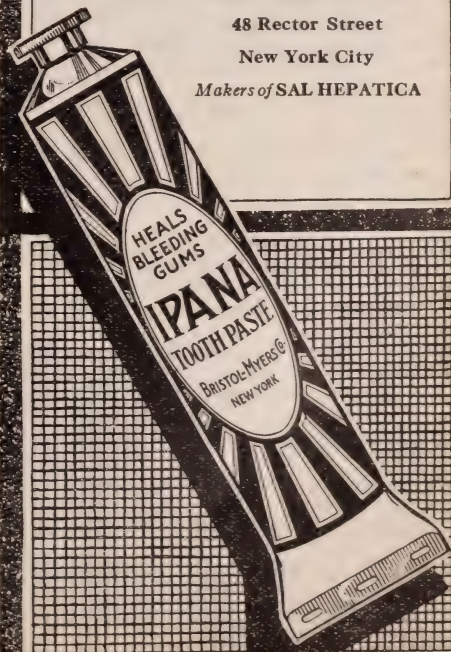
A Professional sample awaits your
card.

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New York City

Makers of SAL HEPATICA



New Jersey State—President, Edward C. Stillwell, Glen Ridge; vice-president, Charles Fankel, Jersey City; secretary, F. E. Hazelton; treasurer, A. E. Boice, both of Trenton.

Tennessee State—President, Oren A. Oliver, Nashville; president-elect, C. E. Byington, Chattanooga; vice-presidents, W. W. Oursley, Memphis; James B. Jones, Murfreesboro; Henry F. Naff, Knoxville; secretary-treasurer, Joe Minor, Nashville. Next meeting will be held at Nashville.

Toledo Society—At the May meeting the following officers were elected: President, C. H. Cox; vice-president, H. R. Francis; secretary, F. B. Conkle; treasurer, G. W. Dierks.

DEATHS.

At Dexter, Mich., April 12, Dr. Charles E. Beeber, recently elected mayor of the village, aged 38. Death was by asphyxiation; suicide.

At Olympia, Washington, April 14, Dr. James William Taliferro, aged 72. He formerly practiced at Glenwood, Ill.

At Lancaster, Pa., April 17, Dr. J. L. Witherow, aged 80.

At Fort Smith, Arkansas, Dr. A. G. Ragland, suicide by shooting.

At Springfield, Mass., April 13, Dr. Andrew J. Flanagan, 56.

At Carbondale, Illinois, April 22, Dr. Theodore A. Holland, colored, 32.

At New Orleans, La., April 19, Dr. Walter F. McKee, aged 60.

At Sawtelle, Cal., April 25, Dr. Osbourne Willson, 91. He was formerly located at Chicago, was for many years president of the State Dental Board and president of the Illinois State Society. He is credited with the invention of sixteen dental instruments in daily use.

At Brooklyn, N. Y., April 25, Dr. John F. Shea, aged 57.

At Springfield, Vt., April 21, Dr. Frank E. Pomroy, aged 71.

At Chicago, Ill., April 29, Dr. John Vanderberg, 58.

At Ohio S. & S. Home, at Sandusky, Ohio, April 27, Dr. William D. Jaques, 77. He formerly practiced at Cleveland.

At Greensburg, Pa., May 1, Dr. Joseph E. Mittenger, 56.

At Reading, Pa., April 26, Dr. Robert B. Beachler, 27.

At Kendallville, Ind., April 27, Dr. Joseph M. Teal, 79.

At Hopkinsville, Ky., April 27, Dr. R. R. Bourne, 57.

At Pierre, S. D., April 28, Dr. George D. Parr, pioneer dentist.

At Chicago, April 30, Dr. J. H. Vanden Berg.

At Utica, N. Y., May 2, Dr. Daniel James Vedder, 76.

At Danville, Pa., May 8, Dr. C. H. Reynolds, 53.

At New York, May 10, Dr. Frank Austin Roy, 55. Suspected suicide.

At Chicago, May 7, Dr. Ard P. Smith. He was a noted hunter and fisherman.

At Chicago, May 6, Dr. Joseph H. Elliott, formerly of Rockford, Ill., 43.

At Brooklyn, N. Y., May 11, Dr. Joseph B. Brown, the oldest practicing dentist in the city, aged 86.

At Philadelphia, Pa., May 15, Dr. Clinton Franklin, descendant of a brother of Benjamin Franklin, aged 60.

On March 14, 1922, Dr. E. D. Scheble, for thirty-five years a prominent and successful dentist practicing in Toledo in association with Dr. Otto Marx. Dr. Scheble was born at Westfield, Ohio, in 1853, was graduated from Philadelphia Dental College in 1874, when he was but 21 years old; practiced one year at Ashley, Ohio, and retired from practice in 1910. At the time of his death he was traveling for his health, intending to make a tour of the world. He was regarded as possessing exceptional skill and was very successful in his profession.

Editor THE DENTAL SUMMARY:

I have a little patient who comes into the office every now and then (a kind of admirer you know) who is a little wizard at poetry. He signs always—BeeBeeBee.

Here's one that I thought might interest the readers of DENTAL SUMMARY.

Fraternally,

DR. DON A. CRAWFORD,

14802 St. Clair. Cleveland, Ohio.

Since Dad has had his teeth pulled out

He always wears a smile;

He's gaining in weight, and there's no doubt

'Twas really worth the while.

The D. D. S. who did the work

Told Dad "It must be done";

And always after every jerk

He'd have "Another one."

I know just how the job was done;

I went along to see,

"An abscess was on every one"

The dentist said to me.

So Dad's convinced that since they're out

His troubles all have gone—

Rheumatics, Bright's disease and gout

Have vanished—every one.

I 'spose you wonder why I kick,

I'll tell you though it's odd:

I have two brothers, Tom and Dick,

And sisters, Ruth and Maude.

They all were feeling kind of blue

And mother had a pout

So what did all five of them do,

But have their teeth pulled out!

I'm just a kid—about to sprout

A few of my "White Pearls,"

I'm sick—but they don't take mine out!

Imagine me—oh girls!

Course, I'm the king at home, you see;

The "toothed" one of the group;

But Holy Jumping Pyorhee!

A King can't live on soup.

—BeeBeeBee.

For your patients' use The Cotto-Tooth-Brush

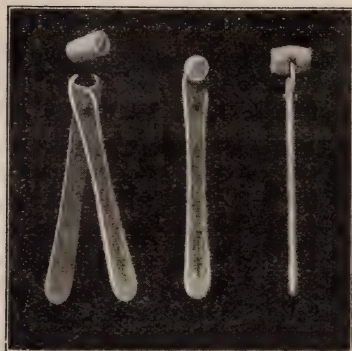
(Johnson & Johnson)

(Absolutely Sanitary)

A modern toilet luxury for cleaning and polishing the teeth

Always New Always Clean

A fresh Cotto-roll for each cleaning



The use of the Cotto-Tooth-Brush with a good dentifrice imparts a high polish to the surfaces of the teeth that is of great value in preventing decay and is noticeable at once in their appearance.

The Cotto-brush for polishing the teeth, used in conjunction with the bristle tooth brush and surgically clean dental floss silk for cleaning between the teeth, makes an ideal toilet equipment for their proper care.

Your dealer will be pleased to show it to you. Explain its value to your patients and refer them to your regular dealer for it.

Ivory Finish Handle and twenty Cotto Rolls complete. per box 85 cents
Additional Special Cotto Rolls. 100 in box 35 cents

Sold by leading Dealers in Dental Supplies

JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.

Classified Advertisements under this heading, \$2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more special rate on application.

FOR SALE—Elegantly equipped going dental office. Brand new September 1921. Office building space built especially for dental office. Perfect decorations, drapes and general arrangement. Three complete operating rooms, two laboratories. Display room, etc. Will sell equipment at reasonable price and sub-lease space if you wish it. Ideal for two dentists or dentist and physician. Located in best uptown section, leaving Ohio city. Address, THE DENTAL SUMMARY, Dept. 630-C

DENTISTS ATTENTION—If you have some practical appliance partially or fully developed but useful to the dental profession we would be glad to manufacture or further develop the same upon terms satisfactory to us both. The Handy Dental Specialty Co., 79 Walnut St., Somerville, Mass. 610-C

FOR SALE—A Dental office and practice, located in Northwestern Ohio, in the middle of a prosperous farming community. Patients know and appreciate good work and are willing to pay for good service. You can locate for \$800.00. Invoice at cost. Equipment and furniture in excellent condition. Rents low. Reason for selling—Am a disabled veteran of the A. E. F. and intend taking vocational training. Address replies to Veteran, care THE DENTAL SUMMARY, Toledo, Ohio. Dept 620-P.

Dr. Prinz Deservedly Honored.

Philadelphia, May 12—Dr. Herman Prinz, professor in the Dental School of the University of Pennsylvania, was awarded the William Jarvis Fellowship Medal, and declared an honorary Fellow by the Dental Society of the State of New York on May 12, in recognition of his remarkable work in dental surgery and mechanics. On the same day Dr. Prinz presented a paper, entitled "Practical Methods for Removing Broken Instruments from Root Canals," before the meeting of the society.

Members of the Louisville Dental Society have organized the Louisville Oral Hygiene Society with the following officers:

Robert L. Sprau, President, Raymond L. Grant, Vice-President, H. B. Tileston, Sr., Secretary and Director of the Clinic.

The new organization is going to lay the matter of dental care for school children before the local school board and ask for funds June 1st.

W. M. RUTHRAUFF—

Announces New Organization

An open letter to Dentists:

Owing to differences between myself and associates in the Pepsodent Company, which company I organized, it was mutually agreed in July, 1919 that we make a division of interests. In accordance with this agreement, the proteolytic field was retained as the exclusive field of the Pepsodent Company and I was released from turning over any improvements in the dentifrice field except such as pertained to a proteolytic dentifrice. It was also agreed that I should stay out of the dentifrice field for a certain period of time in order to enable the Pepsodent Company to establish their product before they would be compelled to meet the competition of my new product, on which they knew I was working.

This period having now elapsed, I wish to announce that I have perfected a new product on which I have been working for years, which is to be sold under the trade name ACIDENT, and that I have organized a new company for the manufacture and sale of this product, known as the W. M. RUTHRAUFF COMPANY.

ACIDENT is based upon the natural functions of the salivary secretions. The functions of these secretions may be classified as follows:

I.—**PROTECTIVE**—Saliva, except after meals, is usually acid. After meals it is normally alkaline. The alkalinity is increased by food acids. This physiological reaction is nature's provision to neutralize food acids and acids formed in the mouth by fermentation of carbo-hydrate food debris, which otherwise would decalcify the teeth.

To further guard the teeth, the saliva contains the starch digestant Ptyalin to render soluble the starch particles which adhere to the teeth, before they can ferment and form acids capable of decalcifying the teeth.

In spite of these protective measures, some decalcification invariably occurs. To counteract this, nature has provided a means of constantly restoring the tooth substance thus removed, by a positive calcifying action.

II.—**CALCIFYING ACTION**—The saliva during the night and before meals (if the interval between meals is sufficiently long) is usually acid, due to the presence of carbon dioxide. This carbon dioxide carries in solution a tooth building and repairing substance—calcium phosphate—which penetrates the interstices of the teeth. As the carbon dioxide evaporates or is neutralized, the calcium phosphate is deposited in the interstices of the teeth, thus recalcifying or replacing calcium phosphate removed by decalcification.

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XLII

JULY, 1922

No. 7

BRIDGE ABUTMENT PIECES FOR TEETH WITH VITAL PULPS

A. O. KLAFFENBACH, D.D.S., IOWA CITY, IOWA

HEAD OF DEPARTMENT OF CLINICAL CROWN AND BRIDGE, STATE UNIVERSITY OF IOWA

(Written for THE DENTAL SUMMARY)

RADIOGRAPHY, FOCAL INFECTION and its injurious effects, and the casting process, all have been instrumental in bringing about a great change in crown and bridge construction.

By means of the radiogram we have been able to study the tissues histologically and pathologically; to observe the effects of poorly fitted and contoured crowns; to note the degenerative changes caused by long-span bridges; to realize how difficult it is to properly fill root-canals, and where devitalization is necessary, to determine the length and shape of root-canals before attempting to remove the pulps of teeth, the roots of which are so curved or constricted that it would be impossible to fill them. In fact, the radiogram is so valuable in crown and bridge diagnosis and prognosis, that it is indispensable.

The casting process has simplified and brought about great changes in the construction of abutment pieces. The gold shell crown, which at one time was thought to be indispensable, is being used less and less and in its place we have the inlay, pin inlay, three-quarter crown, and the full shoulder crown.

Because of these, devitalization is very seldom necessary, thereby eliminating pulp destruction and root-canal filling, and possibly a resultant focal infection. Tooth form is more easily and accurately reproduced and the natural gingival marginal ridge is left intact, thus protecting the periodontal membrane. The continuity of the tooth is preserved, aiding prophylaxis and preventing gum irritation. The Richmond and detached post crowns not being necessary as an abutment piece on anterior teeth, prevents devitalization and the removal of the natural tooth crown. The esthetic results are far better, the display of gold and the possibility of the porcelain not matching, etc., are eliminated.

The cavity preparation for bridge-abutment pieces of the inlay variety must be made according to Dr. Black's teaching. While the outline form may vary some, all margins must be carried or extended into immune areas,

and wherever possible and consistent the cavo-surface angles must be bevelled. The resistance form is always a vital consideration and the cavity should be so shaped that it will withstand the forces exerted upon it. For retention we must depend upon friction to a great extent, therefore our castings must fit in order that they will go to place and be held, at least partially, by frictional retention. Under convenience form we might mention the



A. B. C. D.

Fig. 1—Inlay cavity preparations. (a) Upper first molar M. O. cavity with lingual extension. (b) Upper first molar M. O. D. cavity. (c) Upper first molar M. O. cavity with portion of mesio-lingual cusp removed. (d) Lower second molar M. O. cavity with buccal and lingual extensions.

necessity of having the cavity so prepared that the wax pattern will shed without distortion. Due consideration must also be given to the paralleling of the cavities so that when the bridge is completed it will go to place without undue force. The necessary toilet should never be neglected and may be accomplished by wiping out the cavity with alcohol, drying, and then applying a coating of thin cavity lining.

Since pulp conservation is of paramount importance every precaution should be taken when preparing the cavity not to irritate this delicate and highly sensitive structure. In order to avoid this warm water should be used, and under no consideration should the stones or burs cause heat, nor should cold water or air be used. In extremely sensitive cavities the use



A. B. C. D.

Fig. 2—Upper bicuspid inlay cavity preparations. (a) M. O. D. cavity with portion of both cusps removed. (b) M. O. D. cavity with portion of lingual cusp removed. (c) M. O. D. cavity. (d) Carmichael (modified).

of novocain is indicated, but when same is employed we must proceed with even greater caution, for there is a tendency to work more rapidly and go deeper than is necessary. The cavities should always be prepared in such

a way that the minimum amount of tooth substance shall be sacrificed and the maximum amount of strength be obtained in the finished abutment piece.

INLAYS

When an inlay is to be used as an abutment piece, we must not lose sight of the fact that it will have to withstand a greater strain and must be constructed to withstand a greater strain and additional lateral and torsional stress. Because of this the mesio- or disto-occlusal inlay is not satisfactory and a bridge constructed with such inlays will soon become dislodged.



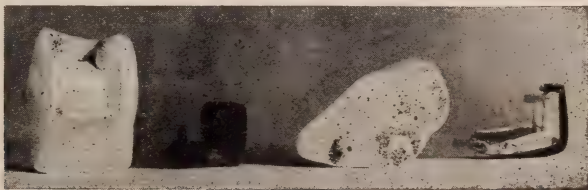
A.

B.

C.

Fig. 3—Inlay cavity preparations. (a) Upper central lingual retention cavity suitable for supporting abutment piece. (b) Upper central step cavity. (c) Upper central M. I. D.

The mesio-disto-occlusal inlay is much more satisfactory, but the buccal or labial and lingual walls of the tooth must be strong or they will be broken or fractured due to the additional and lateral stress. Modified forms of this preparation may also be used, such as the mesio-disto-occlusal, restoring the buccal or lingual cusp or both cusps, the lingual or buccal groove extension, all of which are invaluable and should be used when a suitable case presents.



A.

B.

C.

D.

Fig. 4—(a) Upper bicuspid M. O. cavity preparation for pin inlay. (b) Pin inlay for same. (c) Upper central step cavity preparation. (d) Pin inlay for same.

PIN INLAYS

Inlays with pins provide a very satisfactory means of anchorage. When this method of retention is employed the holes for the pins should be just slightly larger than the wire and should be as far away from the pulp as possible. About 20 gauge clasp wire is used for the pins, and they should be so placed that they will be parallel with each other and in the line of direction in which the wax pattern sheds. When obtaining the wax pattern

the pins (which have previously been roughened and had a small amount of Parr's flux melted over the end which is to become engaged in the inlay wax) are placed in the holes in the cavity and inlay wax softened and pressed to place. Should a pin not come away with the wax pattern, just replace same and with a hot spatula melt the wax around the pin and thus engage it securely. Quite frequently a mesio- or disto-occlusal inlay becomes a very satisfactory bridge abutment piece by the addition of one pin or more.

Another method is to drill the holes and force the inlay wax into them when obtaining the wax pattern, thus forming the pins in wax. This is generally not as satisfactory for the reason that the holes must be made larger

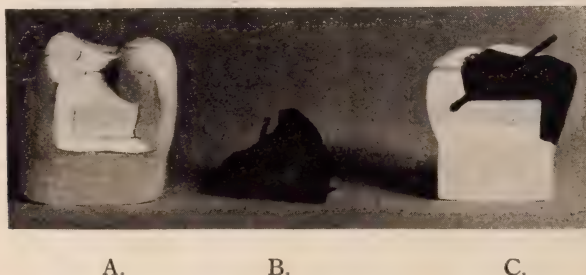


Fig. 5—Pin locked inlay. (a) Upper first molar M. O. cavity preparation. (b) Wax pattern with carbon rod in place. (c) Cross-section showing clasp wire extending through inlay into tooth.

in order to get the wax to the bottom of them, and they are so frail that they are very easily distorted or broken off during the withdrawing or investing of the wax pattern.

PIN-LOCKED INLAY

The pin-locked inlay is so constructed that a pin placed at an angle of about 45 degrees passes through the occlusal surface of the inlay and is anchored in the tooth at a point distant to the pulp and at a point which will not materially weaken the tooth.

When this type of inlay is used the cavity is prepared and the wax pattern obtained the same as for any gold inlay. With the wax pattern still in place in the tooth, a carbon rod (18 or 20 gauge) is heated and pushed through the wax at a 45 degree angle so that it will touch at a place as previously described. The wax pattern with the portion of carbon rod extending above the occlusal surface is removed, carefully invested and cast.

In the construction of a bridge the portion of the carbon rod above the occlusal surface is broken off. The inlays are placed in their respective places, impression taken, etc., and the bridge finished and cemented to place. The carbon rod is then removed with a bur of same gauge as wire to be used, grinding on into the dentine sufficiently to secure anchorage. A clasp wire of proper gauge is then cemented to place, the surplus wire cut off and polished and burnished to occlusion, thus securely locking the inlay into place.

Where added retention is required more than one pin may be used, placing them in different directions.

In Figure 5 is shown the typical mesio-occlusal cavity preparation, the wax pattern removed from the cavity and the carbon rod extending above the occlusal surface of the wax, and a cross-section of the tooth showing the gold inlay in place with the clasp gold wire locking the inlay into place. The portion of wire extending above the occlusal surface is cut off after the wire has been set with cement.

THREE-QUARTER CROWNS

In addition to the various kinds of inlays described, we have the three-quarter crown, which Dr. Tinker has perfected, and which in reality is merely a modified form of the cast gold inlay. To obtain results with this form of abutment-piece it is absolutely essential that the cavity be properly prepared, that the proper kind of gold be used, and that the final casting fit accurately and slide to place with frictional retention.

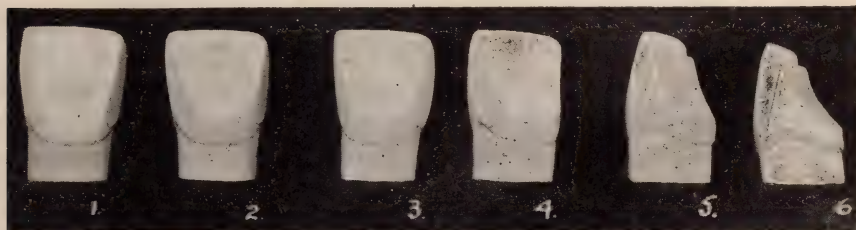


Fig. 6—The six steps for anterior three-quarter crown preparation.

The preparation for anterior teeth has been arranged into six steps (*Fig. 6*), the first three of which are accomplished by means of carborundum safe-side discs and wheel stones.

No. 1. Both mesial and distal proximal surfaces are reduced and paralleled with the long axis of the tooth, care being taken not to destroy the contact points of the adjacent teeth, nor to develop a shoulder at the gingival by not holding the safe-side or lightning disc at the proper angle.

These surfaces should be flattened and extended to the line angle on the labial, the distance on the labial between the two surfaces being greater than on the lingual.

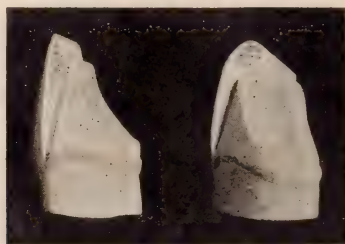
No. 2. The lingual surface is reduced sufficiently to permit a thickness of gold over this surface. The amount removed is determined by the bite.

No. 3. The incisal edge is then beveled. About the same slant is given it as a porcelain facing. This is done for protection of the incisal edge.

The next three steps consist of a series of grooves and the preparation of the gingival.

No. 4. A groove is made extending from mesial to distal in the incisal bevel using a large inverted cone bur. The purpose of this groove is to prevent lingual displacement.

No. 5. The groove on the mesial and on the distal should be made with taper inlay burs, starting with the small sizes followed by larger ones and finally finished with chisels. They are cut parallel with the incisal third of the labial plate and parallel with each other. In this way a groove is produced which terminates at the gingival in immune area and becomes wider labio-lingually and deeper as it approaches the incisal.



A.

B.

Fig. 7—(a) Upper central three-quarter crown preparation. (b) Upper cuspid three-quarter crown preparation

No. 6. A slight shoulder following the gingival outline is made just below the free margin of the gum, care being taken to preserve the natural gingival marginal ridge. A special bur perfected by Dr. Tinker can now be obtained which when held parallel with the long axis of the tooth produces a shoulder at about a 45 degree angle with the axial wall.

After all of these steps have been completed the cavity should be thoroughly examined to be sure that the wax pattern will shed, after which it should be given the proper toilet.



A.

B.

C.

D.

Fig. 8—(a) Lower cuspid. (b) Lower incisor. (c) Lower first bicuspid. (d) Lower molar three-quarter preparations.

The preparation of the upper cuspid (*Fig. 7*) is the same as for the central with the exception of the incisal bevel and groove, which are not made straight across but follow the outline of the tooth. This is done to avoid getting too near the pulp and also conserve tooth substance.

In the lower anterior teeth (*Fig. 8*) because of their size, difference in direction of stress, and the fact that the thickness labio-lingually does not interfere with the occlusion, it is not necessary to remove but very little

from the lingual and in some cases none from the incisal third. The incisal edge is beveled just sufficiently for the incisal groove. In most cases it is not necessary to carry the gingival outline beneath the free margin of the gum on the lingual but instead it may follow an outline similar to the one shown in A and B.

Lower molar preparations differ from those of the upper molars in that the buccal surface is removed instead of the lingual. By so doing that portion of the tooth which receives the most stress is protected, and as this surface is much more accessible, on the lowers, the cavity is much more easily prepared and the wax pattern more readily obtained.



A. B. C. D.

Fig. 9—Upper bicuspid three-quarter crown preparations. (a) Lingual cusp and surface. (b) Lingual cusp and portion of lingual surface. (c) Lingual and buccal cusp and portion of lingual and buccal surface. (d) M. O. D. preparation with lingual cusp and portion of lingual surface.

Because of the short lingual cusp on the lower first bicuspid the buccal surface is included in order to obtain the required retention. In most cases no mesial and distal grooves are required, enough retention being obtained by paralleling the mesial and distal surfaces and the reduction of the buccal and lingual surfaces and cusps as shown in *Figure 8, C*.

The upper first and second and the lower second bicuspid are prepared practically the same; the proximal surfaces are parallel, the lingual surface reduced, the occlusal surface reduced and so shaped that it terminates in an acute angle with the buccal wall. The mesial and distal grooves are cut parallel with each other and with the long axis of the tooth as far buccally as possible so the margins will be in immune area.



A. B. C. D. E. F.

Fig 10—Upper first molar three-quarter crown cavity preparations. (a, c, e) cavity preparations. (b, d, f) three-quarter crowns in place.

In *Figure 9* are shown the bicuspid preparation and modifications, A, showing the entire lingual surface removed; B, a portion of the lingual surface left intact; C, both cusps and a portion of the lingual and buccal

surfaces removed; D, mesio-disto-occlusal preparation with a portion of the lingual cusp and surface removed. Preparation D is used in cases where a gold or amalgam filling had been previously placed.

These same preparations are applicable to the upper molars and in *Figure 10* are shown the restoration of the lingual cusp and lingual surface; the restoration of both cusps and a portion of the buccal and lingual surfaces; the restoration of the lingual cusp and a portion of the lingual surface and the cavity preparation for each.

WAX PATTERN

The wax pattern may be obtained by either the direct or indirect method. When the direct method is employed perfect wax patterns may be obtained by careful application of the following directions:

1. Select copper band slightly larger than diameter of tooth. Festone band gingivally, also cut away enough of the occlusal end of band to



Fig. 11—Lower molar preparation, wax pattern, and three-quarter crown in place.

allow free occlusion. Cut V-shaped slit from occlusal and gingival ends on the labial or buccal surface of band leaving a small portion of matrix between the two ends of the Vs. This is done so that the band may be easily split and removed from the wax. Then shape the band so it conforms to the shape of the tooth providing sufficient space for the wax between the tooth and the band.

- 2. Fill band with softened inlay wax, cup out some of the wax in the band, cavity surface to be. No wax is left on the labial or buccal surface.

3. Force band and wax on the tooth, using labial or buccal surface of tooth as guide.

4. Chill wax and remove any excess that may overhang band.

5. Remove band and wax and place a drop or two of hot water in impression and force to place on tooth and let patient bite into it.

6. Chill, remove all excess wax and carve occlusal or lingual surface as much as possible while wax pattern is in the matrix.

7. Remove band and wax.

8. Separate band by cutting on labial and spreading same, being very careful not to distort wax pattern.

9. Place wax pattern on the tooth, shape to proper contour. Burnish all margins with smooth wax instrument.

10 Place china silk tape around tooth and wax pattern, pull labially or buccally with equal pressure exerted and examine occlusion.

11. Remove, invest and cast.

For anterior patterns the sprue should be placed in the incisal third of the lingual surface, for the posterior at the linguo-occlusal line angle.

In *Figure 14* is shown a band for a bicuspid and a central incisor and the same in place with wax. The manner of cutting the V-shaped slits and shaping the occlusal of the bicuspid and the lingual of the central is also shown.

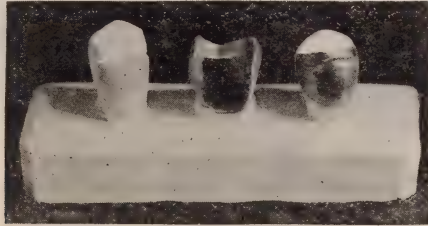


Fig. 12—Upper bicuspid preparation, wax pattern, and three-quarter crown in place.

When the indirect method is used a copper band is fitted and an accurate modeling compound impression is obtained. An amalgam model is made. Another copper band impression is taken, placed on the tooth over which a modeling compound tray impression is taken. The wax bite is also obtained at this time. When the amalgam model has hardened it is removed from the band and placed in the band in the modeling compound impression. The root of amalgam model is oiled and a piece of wax is fastened near the root and extending labially or buccally, to act as a guide when the amalgam model is removed from plaster cast. Plaster casts are

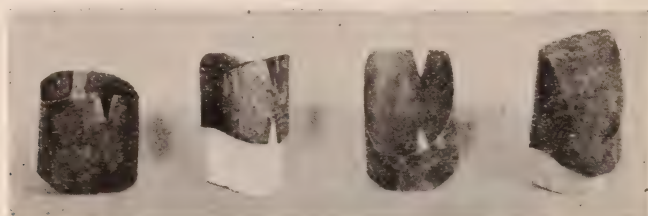


Fig. 13—Cuspid preparation, wax pattern, and three-quarter crown in place. then made and mounted on the articulator and the wax pattern secured from the amalgam model. After the three-quarter crown has been cast it may be placed on the amalgam model and swaged.

The manner in which the wax pattern is obtained is not as important for it is accuracy that we desire. It is very essential that the pattern fit the cavity surfaces perfectly, and that it be carved, contoured, have contact points restored, be burnished to the margins and polished just as we want

the finished casting. The care and time taken to procure a wax pattern, such as described, is well spent for if the wax is properly manipulated, invested, and cast, the resultant abutment piece will fit with precision and be an exact duplicate of the wax pattern.

The importance of properly investing the wax pattern and the process of casting must be given due consideration, for even though the cavity is perfectly prepared, the wax pattern as desired, the final abutment piece will



A.

B.

C.

D.

Fig. 14—(a) Copper matrix band trimmed and shaped for bicuspid. (c) for central. (b) Matrix and inlay wax in position on bicuspid. (d) on central.

not be perfect if a poor investment be used, if it is not properly heated and manipulated, or if the gold is not properly treated, heated and cast. So much has been written upon both of these phases of the cast inlay, etc., that I will not describe any particular method.

As all bridge abutment pieces must bear more stress than the average inlay better results will be had by using gold containing a small amount of platinum. In all ordinary three-quarter crown construction very gratifying results will be obtained by using Tinker T gold. In cases where the maximum amount of strength and the minimum thickness of gold is desired, such as on lower incisors and cuspids and where the posterior teeth are



A.

B.

Fig. 15—(a) Upper central preparation. (b) Wax pattern for same.

short, not permitting much occlusal reduction, Tinker TT gold may be used.

Under no consideration should any casting be made without having a clean button each time. This is readily obtained by melting the gold on a charcoal block and treating it with borax and saltpetre.

CONCLUSION

It has been my desire to bring to your attention some of the bridge abutment pieces that can be used without devitalization. Also to point out the facts that sound judgment must be exercised, and a thorough knowledge of

the requirements of the case must be had in order to determine what kind to use. Not only is this necessary, but great care must also be exercised in preparing the cavity, in obtaining an accurate wax pattern, in investing and melting the wax, in heating and casting the gold, in fact every step must be carried out to the minutest detail.

Pulp conservation is of vital importance; therefore, every effort should be put forth to construct bridge abutment pieces that will require the smallest amount of loss of tooth substance; be strong enough to withstand the stress brought upon it; must fit so there will be no subsequent decay around the margins; and last, but not of least importance, the gold must not encroach too near the pulp so that thermal changes, etc., will bring about pulp degeneration and destruction.

Where these precautions are not observed a dead pulp is very likely to be the result and it would have been far better not to have attempted to place a bridge at all than to have brought about this condition.

HE HELD THE WHIP HAND

A salesman sold a bill of goods to a merchant in a small town. They were returned as not satisfactory. The wholesale house undertook to collect anyway, and drew a sight draft on the bank at the customer's town. The bank returned the draft unpaid. Then the house wrote to the village postmaster and asked if the merchant was good for the bill. The letter was returned O. K.'d at the bottom. Next the postmaster was asked to put the bill in the hands of a local lawyer for collection.

The answer received by the wholesaler ran as follows: "The undersigned is the merchant on whom you tried to palm off your worthless junk. The undersigned is also president of the bank that returned your draft. The undersigned is the postmaster to whom you wrote, and also the lawyer whom you tried to get to collect your bill. And if the undersigned were not also the pastor of the local church, the undersigned would tell you to go straight to the devil."—Cleveland Plain Dealer.

OF PULPLESS TEETH*

BY W. CLYDE DAVIS, A.M., M.D., D.D.S., LINCOLN, NEB.

DEAN DENTAL SCHOOL, UNIVERSITY OF NEBRASKA.

THE INVITATION TO APPEAR as the essayist this evening contained the information that a medico-dental audience was expected and the request to choose a "subject of mutual interest."

As both physican and dentist have to do with the restoration and preservation of health, their spheres of usefulness are continually merging. More frequently, and to the greatest degree do these blend when dealing with patients of questionable health, the hosts of pulpless teeth, and giving evidence of infection in tissues adjacent to the teeth. It therefore follows that the greatest public service can be obtained only through the most hearty cooperation. To that end let us draw near.

The subject of focal infection has been so thoroughly discussed in the professional journals in recent years that it needs but a passing mention to remind all of its importance in this connection. Our sense of well-being, our health and our lives depend upon getting infection within our bodies below the balance of bodily resistance. It follows that happiness, health and long life are fostered by bringing resistance to the maximum and lowering infection to the minimum.

The helpful attitude of all, physicans, dentists and people, sick or well, should be to eliminate infection wherever and whenever possible to do so without creating greater injury in the process.

The problems presented to us in daily practice are divided into two distinct classes: One is the restoration to the normal after the breaking point has been passed, and the other is prevention. In the first class, the physican is the primary consultant and instigator. With the second class the dentist should be the vigilant and instigator insofar as the mouth and teeth are concerned. These divisions are given in the order of interest at this time and possibly in the order of importance now, as we are in the midst of an emergency, but in reality prevention is primary and must rapidly and eventually come to the fore. The dentist must rise to the occasion; to the full measure of his responsibility, if he is to retain or attain the full confidence of the public.

We realize this program is an ambitious one, fraught with many trying conditions due to the admissions of yesterday's errors, that must be atoned for in an honest application of today's knowledge that tomorrow we may have a more perfect day.

*Read before the Gage Co., Neb., Medical and Dental Societies, April 19, 1922.

Education is therefore essentially a knowledge of the facts as developed in preparation. The medical and dental student must be educated alike in the fundamentals of biology, histology, chemistry, bacteriology, pathology and clinical diagnosis, that they may attain common ground for the intelligent consideration and discussion of and action in cases which are bifocal with the physician and dentist; hence the five-year dental course in many of our universities, including your own state university. If dentists are to come into their own, they must *command*, not demand, respect for their findings in joint consultation.

We will proceed to a more direct consideration of the subject of pulpless teeth. First, the sick. The physician has been consulted and the patient found to be suffering from ills which may or may not be caused by infection. Is the patient suffering from an overload of infection? This question can not be answered positively without the blood-count to ascertain the deviation from normal in the number of red and white cells per cubic centimeter, and the percentage of polymorphonuclear leukocytes. This blood picture should be associated with the urinary analysis and general physical examination. With such an examination resulting in a positive finding in certain well-known particulars, we are on the scent and should proceed by the process of elimination to find the source of infection. Short of this is guesswork.

The physician who simply looks into the mouth and seeing much dental work or teeth badly stained and orders surgery is only guessing or bluffing. He is either ignorant or not making use of the knowledge which he has. On the other hand, the dentist should be able to read these findings, check up the charts and understand the importance of the varied degrees of deviation from normal, and appreciate the significance of each abnormality.

Agreed, we are again off to the chase. It is stated pretty generally by keen observers that the order of importance in the degree of liability to being a source of infection is:

First, the digestive tract; *second*, tonsils; *third*, the nasal cavity and accessory sinuses; and *fourth*, the mouth and teeth. The medical practitioner will then do well to investigate the first three in the order named before considering the teeth. The dentist should not take exception if he has been ignored until this time, but should answer the call with whole-hearted cooperation when asked to check up the teeth and surrounding parts, even though this may bring into question some of his most beautiful dental operations of yesterday.

This means a careful oral clinical examination such as only a skilled and properly educated dentist can give, the roentgenogram being a link in the chain of evidence. I say "link in the chain of evidence" as it alone is far from conclusive. An X-ray (commonly

so called) does not disclose the presence of infection. It only shows rarefied areas which may or may not be infected, and which may or may not have been caused by a rarefying osteitis, the result of infection.

On the one hand, we frequently see pronounced bone spaces about the apices of vital teeth, while on the other hand some of our worst cases of focal infection do not give any radiographic manifestations of abnormality.

But can we read X-rays? The sale and installation of X-ray machines has far outstripped education in this particular branch of medicine and dentistry. For that reason many are guessing at the conditions and seeing little. For that reason, many look for large fillings, root fillings, crowns and bridges, and condemn these teeth when they see nothing abnormal in the periapical region. Did you ever cover up all of the teeth so that you could see nothing but sub-dental tissues and then read the conditions? We are going to have a little practice of that nature this evening, and we will for once at least realize to what extent we have been reading dental work and not roentgenograms.

To continue, it has been decided that this particular patient has certain teeth which are the source of undue infection and we intend to apply a remedy. We say "undue" infection because it has been proved that cultures may be grown from 43 per cent of all vital pulps, and that infection may be aspirated from nearly all alveolar processes near the apices of teeth with vital pulps. If infection *must* be *completely* removed from these tissues—well—well—it *cannot be done* and leave the tissues vital, any more than we can render absolutely free from infection the skin, alimentary canal, blood stream, body orifices—hence, *undue* infection, *injurious* infection, or *preventable* infection.

With this patient, it has been decided to act. We will base the recommendations as to methods on the present teachings at Rush Medical College; Forsyth Institute, Boston; Harvard University, Boston; Michigan University, Ann Arbor; and several other universities having either medical or dental colleges, or both.

Pyorrhea alveolaris is now regarded as one of the most easily cured of human ills and the treatment is simplicity itself and entirely surgical. The teachings today are to surgically remove the pocket or pockets. There are two ways: one, the extraction of the tooth or teeth; the other, the cutting away of all external tissues which enter into the formation of the pockets and thorough curettement of the affected bone. We said "affected bone," not "infected."

This patient has been in the operating chair one hour, anesthetic and all, and is leaving without pyorrhea. Simple oral hygiene with no medication, and Nature does the rest; that is, if you have done your duty as a surgeon.

Perchance this is a case of pulpless teeth and attempted root fillings. It is impossible to practice pulpectomy in 95 per cent of the cases, as that per cent. of the roots of teeth has more than one foramen. Multi-foramina causes the cases to result in partial pulpectomy.

This fact brings us face to face with the practice of yesterday, when all dentists devitalized the pulps of teeth with arsenic before attempting pulpectomy, which in most cases was not completely accomplished and these millions of teeth have lateral canals filled with the remains of portions of devitalized pulps. Many of the teeth now show more or less marked rarefied areas about the apices and some which do not show this condition have proved equally dangerous.

What is to be done with all of these known cases? In the clinics of our larger universities, with the sick wherein the nature of the lesions are serious and time is an element of success, surgery without delay is routine practice. The teeth are removed and the adjacent tissues are thoroughly curetted at one or more sittings, properly spaced, mindful of the effect of the reaction following the opening of the blood stream in increased doses of infection.

When the manifestation is mild and there seems to be time for more rational treatment, the pulp canals of the teeth are reopened and pure metallic silver is deposited within the canals and their branches and upon the denuded ends of the apices of the roots. In case there appears to be denuded and of necessity dead cementum at the root end, surgery is resorted to and apicoectomy is the accepted practice of the day.

Following this treatment, there forms a connective scar-tissue over the mouth of each foramina and adjacent to the apex of each root, the same as about the bullet, silver plate, or silver wire so commonly used by our surgeons. If one is bad practice, so is the other, as the microscope proves the same encapsulation with connective scar-tissue. However, both methods are now used by the surgeons, general and dental, and with similar results. But why let the known cases of pulp devitalization with arsenic remain until there is systemic manifestations of trouble? If dentists would begin *at once* to eliminate such cases from their patients' mouths by the method outlined, much disease and surgery would be obviated. It is no doubt the largest undertaking before dentistry today and should go forward at once, and not wait until the health is affected and teeth are lost, with the chain of evils which follow infected dead pulp-tissue in the foramina of teeth.

Fortunately many of the dentists of the past few years have abandoned pulp devitalization and have attempted pulpectomy with the use of novocain, which has left vital the apical portion of the pulp not possible to remove. When these cases have not been

infected past the ability of the leukocytes in the blood stream to master, the pulp has healed by the usual process of the formation of a connective scar-tissue in the stumps remaining, and by accident we have had that occur toward which we now aim in our partial pulpectomy cases; that is, we intentionally practice partial pulpectomy, which if done with the usual surgical antiseptic precautions employed by the successful surgeon, will give every promise of as great percentage of success as any other surgical operation involving similar structures.

In about 90 per cent. of the cases of partial pulpectomy, the stump of the pulp remains vital and begins a slow process of obliteration which is completed in from eighteen months to fifteen years in about ten per cent. of the cases so operated upon. This percentage is based on 174 cases microscopically examined by the writer, beginning in the fall of 1919, a preliminary report of which was given in the *Dental Cosmos* of June, 1920, and in THE DENTAL SUMMARY of April, June, July, August and September of 1921, and also in the *Dental Items of Interest* of February, 1922. The cases sectioned and microscopically examined were those of unintentional partial pulpectomy. In the University of Nebraska Dental Clinic, we now have over 400 cases of intentional partial pulpectomy and partial root fillings with the most flattering results.

ENGLISH AS SHE IS WROTE—SOMETIMES
Dr, Charles Taylor,
Memphis Tenn.

Dear Sir:-

I want you to tell mee what it will cost to have 2 set of
teeth pulles,
There would not bee moore than 28 teeth to pull,
You have ben recommended to bee A good hand,
So make it as cheap as you can as the trip is along ways
to get teeth extracted, Yours,

ESSENTIALS IN THE CONSTRUCTION OF
ARTIFICIAL DENTURES*

BY L. L. SHEFFIELD, D.D.S., TOLEDO, OHIO.

THE OBJECT OF THIS PAPER is to make obvious some of the necessary steps in denture construction. To begin with, a pre-preliminary impression is taken in compound before the teeth are extracted, and a cast made of some white material, preferably Model Stone. This cast is a very valuable guide in the arrangement of the artificial teeth on the denture under construction.



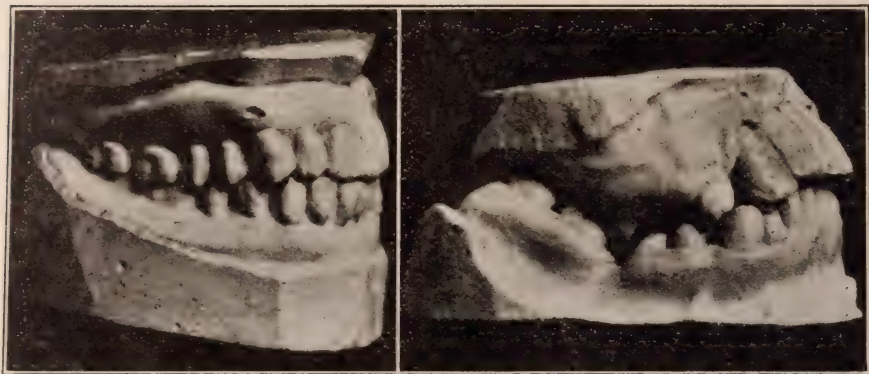
By using a Boly gauge the distance from cuspid to cuspid may be obtained and may be used to advantage in posing the teeth in the new denture if desired. From it may be obtained their position in the arc of the circle, the general inclination of the long axis of the teeth as regards the median line, whether mesially or distally inclined from a line drawn perpendicular to the occlusal plane. The same information regarding any of the other teeth that remained when the pre-preliminary impression was taken, likewise may be obtained and used in the posing of the teeth in the new denture, if deemed desirable. At least it gives you a general idea regarding the original posing of the teeth, also the mandible and maxilla may be maintained at their original distance apart by this means.

Occasionally, too, a patient may say of the finished denture, "These teeth don't have as pleasing an appearance as my own," and right there is the time when you shake hands with yourself if you have a case made from a pre-preliminary impression that you can show them; because your patients positively forget how their

*Read before the Ohio State Dental Society, Dec., 1921.

own teeth looked, and have a very exaggerated imagination regarding them. You can easily make a point for yourself when taking the pre-preliminary impression by remarking: "We'll have this to compare with later on."

After extraction, and after healing of the gums has taken place, preliminary impressions of the maxillary and mandible are taken and



the casts made. Over these preliminary casts the impression trays are formed, and the compound with which the impressions are to be taken is adapted.

When the gums are entirely healed, the impressions are taken by the Tench method, plus variations, impressions boxed in, coated with sandarac varnish, and casts made that are to be used in the construction of the dentures.

These impressions are the best from which to secure central occlusion and make the mandibular registration, because they stay in place; they are the right height, and have the proper freeway.



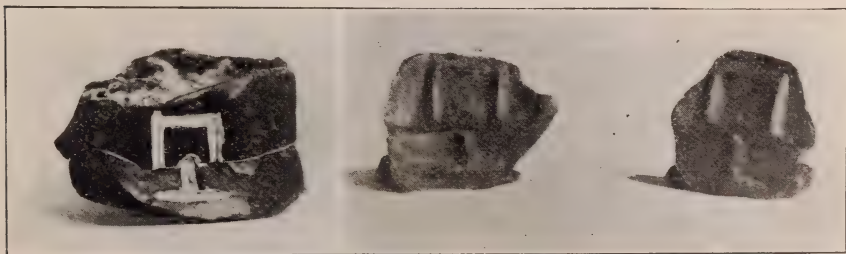
Their removal without distortion from the casts is easy, and is as follows: The case is submerged in hot water, just to the edge of the impression, and when the compound at this edge is soft enough to be easily penetrated by the finger nail, the point of a knife blade

is inserted at the periphery of the impression in the second molar region and pried up just enough to see it start, and then pressed with fingers back to place. The same is done to the opposite side. Then chill immediately in cold water, and when thoroughly cold, remove from the cast. If you have been careful, no perceptible change will take place during the foregoing procedure.

The original impressions after removing from the casts without any visible distortions are here presented, with two vertical grooves



united by a transverse groove on each side of the upper in the region of the second bicuspid and first molar. Immediately below this in the lower impression on each side is cut a vertical groove from the occlusal plane extending downward two-thirds of the distance to the periphery, to the center of the transverse groove. These grooves are for receiving the bite-locks. The vertical grooves are to preserve the mesio-distal relationship, the transverse grooves for maintaining their vertical position and permit the holding of the upper and lower impressions in one hand by grasping the bite-locks between the thumb and finger.



Central occlusion was established and has been maintained during the taking of the impressions, and can now be verified by inserting the impressions in the mouth, and placing the forefinger of each hand on the edge of the lower impression in the bicuspid region; exerting slight pressure conveys the sense of resistance in that locality and unconsciously they resist that downward force by the natural masticating force which is exactly what you want them to do; now request the patient to open the mouth wide, place the tip

of the tongue to the distal border of the upper impression and close the jaws together. Repeat this several times and if the wedges of compound on the lower impression close into the corresponding grooves in the upper impression each time, it is reasonable to suppose that central occlusion is correct. For further proof have the patient part the jaws just far enough to disengage the wedge of compound on the occlusal plane of the lower impression from the corresponding in the upper impression. Instruct the patient to protrude the man-



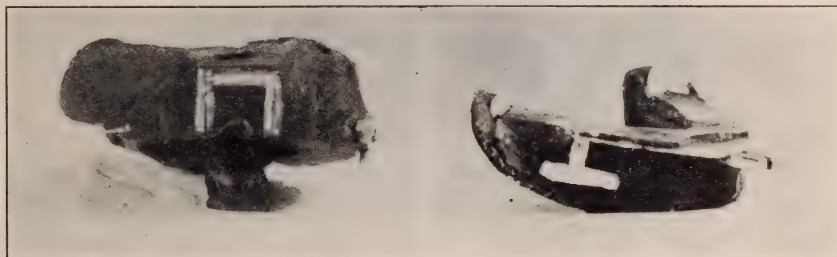
dible, then retract it as far as possible. Have him close and repeat this several times. If the wedge in the lower impression fits exactly into the upper each time, it is reasonable to suppose that the central occlusion is correct. Remember, the patient may exert a distal retracting force that may retract the mandible farther than is normal, but over-retracting is accompanied by an obvious effort. In that case say, "Do it easy. Don't strain yourself." And, after a few trials you will be confident that the central occlusion is correct. In case these trials prove central occlusion, as previously taken, incor-



rect, add compound where new wedges should be, and soften the old wedges and the newly-added compound and insert in the mouth, holding the index finger of each hand on the edge of the lower impression, and instruct the patient to place the tip of the tongue far back in the roof of the mouth and close, and squeeze (don't say

"bite") the jaws tightly together, thereby making new wedges on the lower and establishing central occlusion. Verify this as previously stated.

Now imbed the horse-shoe plate, that has the center removed, leaving only the stem and periphery about 4 mm. wide, into the compound of the lower impression immediately below the occlusal plane, being careful to avoid any distortion, and melt a film of black wax on the tracing field of the horse-shoe plate to receive



the incisal-path record. Put the incisal-path marker in position at the median line on the upper impression and incline the point slightly lingually. Place the impressions in the mouth, and find and mark with a pencil on the face the location of the condyle. Caliper the distance from condyle head to condyle head with the face-bow. Then equalize the distance on the condyle rods of the face-bow, so that when it is replaced it will be centered; lay aside the face-bow. Instruct the patient to close the jaws and hold firmly together.

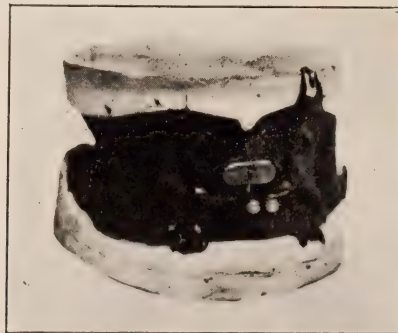


Without trays, place pieces of hot compound in the mouth between the cheeks and the impressions directly over the grooves which have been previously cocoa-buttered, and grasp the patient's face between thumb and fingers and press the soft compound to place; chill with ice water; place detachable stem on the horse-shoe plate, position previously adjusted face-bow, tighten set screw of the cylindrical block and remove from the patient at once. Pick off

bite-locks, place in ice water, remove impressions and trim off the wedge of compound from the occlusal plane of the lower impression that fitted into the corresponding groove in the occlusal plane of the upper. These wedges are no longer needed for maintaining impressions in central occlusion, and would interfere with obtaining the incisor-path records.



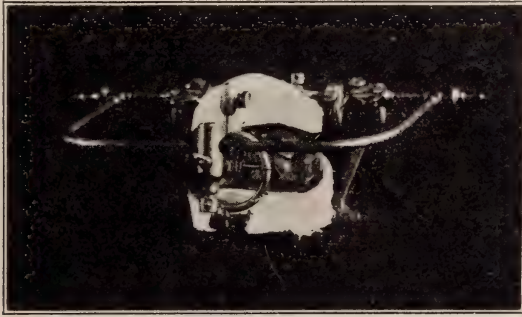
Cocoa butter the occlusal plane, replace the impression in the mouth. Have patient move the mandible as in masticating. If he really does this the marking will be an angle when viewed from above downward. Keep trying until you get this correct. If a crescent-shaped marking is obtained, it was made with the mandible protruded, and indicates error. In that event, obliterate marking with hot spatula and try until the correct angle is obtained. Remove from the mouth and thoroughly dry the impression, preferably with



compressed air. Seal the bite-locks to the impression, place casts in their respective places, and fasten with hot compound. See that the point of the incisal path-marker is at the point of the angle previously recorded on the tracing-field of the horse-shoe plate. If not, a correction is needed. Assemble the horse-shoe plate and the detachable stem which is a part of the previously-adjusted face-bow, and transfer to the occluding frame.

Up to the present time we have had no guide as an aid in determining the hue or even an approximate hue of the teeth. The

dermal appendages of the human being of the white race, taking them as a whole, are made up of one or many hues, the eyes in particular. From observing and recording the findings for some time in the past, I have formulated the following key to determine the approximate hue of the teeth from the shade of the eyes and color



of hair at age of twenty. I have selected twenty because that is the age of maturity, and the person is at that age in the bloom of youth.

KEY TO DETERMINE HUE

- No. 1. { Brown eyes and brown hair at the age of twenty.
Shade 7, 8, T. C. Trubyte.
Light tooth, yellow in evidence.
 - No. 2. { Brown eyes, auburn hair at the age of twenty.
Shade 16, 20, Trubyte.
Deeper yellow than No. 1.
 - No. 3. { Blue eyes and black or very dark brown hair at age
of twenty.
Shade 4 or 5 Trubyte, the lightest hue we have.
- Nationalities involved to date in No. 3. { Irish, Polish,
French, English,
German & Hebrew
- No. 4. { Blue Eyed Blondes, and blue eyes and very light brown
hair at the age of twenty.
Not Auburn Hair.
Shade 15 Trubyte.
 - No. 5. { Grey eyes and light brown hair, with auburn mustasche,
muddy complexion.
Shade 14 Trubyte.

- No. 6. { Blue, brown and yellow mixture viewed as a whole are green eyes.
Auburn hair, "Red Head" at age of twenty, hair turned to a reddish brown, muddy complexion.
This combination of coloring is a contrast to the rest of the color scheme. Shade 9 Trubyte has been selected with pleasing results.

The above is not by any means an infallible guide, but by its use we can have at least a place to begin, and is usually within three shades.

Hair is the first consideration, eyes second. The eyes may be composed of many colors, for example, blue, orange and brown, blue being the predominating color, and should receive the greatest consideration.

In the use of this key to determine shades, it will take careful deliberation, and in drawing your conclusion use six anterior maxillary teeth, arranged on Kerr's modeling compound, because that is approximately the same shade as the vulcanite base of which the denture, or at least its attachments, are composed.

If in doubt as to which one of several shades, mount sets of sixes as before mentioned, and place alternately in the mouth. View each one only a few seconds continuously, with the light coming to your patient over *your* left shoulder, because light coming over the right shoulder is a deception in determining the hue, and you will not have the hue you thought, when the finished dentures are inserted.

At the time of taking pre-preliminary impressions make a record of color of eyes and shade of hair at twenty. Determine tooth form and hue from their own, if existing conditions permit, if not, determine tooth form from face form, and shade from color of the eyes and hair.

By making immediate, reliable, adequate and permanent records of the color of eyes and shade of hair at twenty, after sufficient number of records have been compiled, deductions can be made regarding hue of the teeth compared with eyes and hair, and for the purpose of convenience in keeping records I have made this record sheet which contains places to record the necessary and desirable information regarding the patient.

Besides name, address and phone number, we should know his financial rating and business, who referred by, and when acknowledgment was sent, whom referred to for extractions and oral surgery, and when acknowledgment was received and his diversion. It is pleasant for the patient to have you ask him his score in his last game of golf, *i. e.* if he makes a good score or how his

Franklin's running. It is pleasant for him to know that you remember his diversion.

It is well to know when he consulted you for examination, what your contract was, and how and when the bill is to be paid, when pre-preliminary, preliminary, and the impressions were taken, and by what method, and the mouth classification. It may be quite necessary to know at some future time the condition of the gums when you took the case, at least it is interesting to check up your past

Name	John Doe	Referred by	C. Doe, M. D.
Address	101 Clark Ave.	Acknowledgment sent	7-2-1921
Phone No.	M. 241	Referred to	Dr. Doe, Exodontist
Rating	A-1	Acknowledgment received	7-4-1921
Business	Manufacturer	Diversion	Golf—Drives a Franklin

1921 Date	7-2	Consultation	Measurements	Contract	250.00, 1/2 down, bal. on insert.
7-2	Pre-preliminary Imp.	Lateral Path R. 18 L. 16	Condyle Path R. 38 L. 30	✓ Upper	✓ Lower
	Remarks Teeth Past re- demption	Median Line R. 7	to Condyle L. 13	✓ Full	✓ Full
7-15	Preliminary Imp.	Occluding Gysi	frame used Adaptable	Partial	Partial
	Mouth Classification 1.			Gold	Gold
				Continuous	Continuous..
				Gum	Gum
				✓ Vulcanite	✓ Vulcanite.
7-16	Imp	Lab. Chart	Teppers	Tooth Chart	
	Method. Trench with vari- ations	Pink Rubber	Gran Gum	Nationality	Irish
	Co-operation Very best	Red Rubber	Ash and Son.	Color of eyes	Blue
	Remarks Had worn upper denture; lower ridge large	Eng. Base	Reline Rubber	Shade of hair at age of twenty	Black
7-18	Measurements	Cast Material	Model Stone	Shade of teeth 5 Class 2 Form 3	
7-20	Try-in			Mould of six anteriors	Upper 3. N. Lower 3. C.
	Remarks Satisfactory pa- tient; pleased and enthusiastic	Time Total	Hrs. Min.	Make	Trubyte
7-21	Lower Reline			Mold of	Maxillary 30. L. Posterior Mandibular 30. S.
7-23	Dentures Inserted			Remarks	
	Remarks Apparently correct in every detail				

Charges		Credits		Balance	
Date	Amount	Date	Amount	Amount	
7-2	5.00		5.00		
7-16	120.00		120.00		
7-23	125.00		125.00		

work to see how conditions maintain or change. Whether the patient gave good co-operation or left it all to the dentist, and simply said, "I can't," when requested to assist, and whether he had previously worn dentures, whether or not the patient was pleased, what time the lower was rebased, and your own opinion of the dentures at the time of insertion.

Perhaps you may have occasion to replace dentures on the occluding frame; in that event simply use the Snow face-bow, and set your adaptable occluding frame, from your records, and save taking all the measurements. You may wish to know when you buy your next stock of teeth, the number of the hue, and the molds most frequently used, it would be easy to ascertain. Occasionally a patient will break a tooth. Then is when you are glad, turning to your record you find Shade 5, Trubyte, six upper anteriors Mold 3.N.: six lower anteriors Mold 3.C., the maxillary posteriors Mold 30.

Long. The mandibular posteriors 30. Short. It makes the ordering of the tooth to make the repair a very simple matter, the work of grinding to place the easiest possible, and the appearance of the repair the best.

I have also a place to record the time spent in producing the work, so that from the records, standards may be established.

Having records of the time, cost of material, and overhead expenses, the cost of production may be calculated, and a remunerative and justifiable fee for service rendered may be demanded.

A Woman's Instinct

Some years ago, after I had completed some Dental Work for a lady, she produced (from a pocket in her petticoat) a full set of teeth, uppers and lowers, and said: "These were my mother's and I want to sell them to you." I explained to her that I could not use them but she insisted that they were as good as new and that I could reset them for somebody and "if they do not know it, then it will be all right." What's the difference. After considerable argument, "to get rid of her," I offered to deduct \$1.00 from her bill and told her that I would throw the teeth away. She "was delighted" and paid for her work less the \$1.00.

The old plates were thrown in a drawer in the laboratory and forgotten. About five or six years later the same lady came in to have her teeth extracted and have full dentures. Then I remembered the incident several years before and after considerable search the old plates were found, the teeth removed, polished, and reset for her, and now she is wearing her dead mother's teeth, but does not know it. Of course she said "if they do not know it will be all right." The old plates of her mother's had seen about one year's service and were in good condition.

What would you have done with a skin-flint like her. Did I do wrong? beating her at her own game.

D.G.—*In Dental Facts*

FOREIGN BODIES OF DENTAL ORIGIN
IN THE LUNGS AND ESOPHAGUS*

BY CHAS. F. BOWEN, PH. C., M. D., COLUMBUS, OHIO.

FOREIGN SUBSTANCES which may accidentally slip into the throat during a dental operation may produce alarming symptoms, either immediately or at some future date. So many cases have been called to the author's attention recently that it seems advisable to call the attention of the dental profession to the possibility of such accident.

Let us consider what may happen to a foreign substance which has accidentally slipped into the throat. Two things may happen. Either it enters the esophagus or else it enters the larynx. If it enters the esophagus it may pass on down into the stomach without producing any injury, and eventually pass without the patient even knowing that an instrument, tooth or bridge had ever been lost. But suppose the foreign substance becomes lodged in the esophagus, either because it is too large to pass, or because it has a sharp projection which has become fastened in its wall.

In this case, only one thing can happen, and, that is, inflammation, swelling, starvation and death. The longer a foreign body is allowed to remain in the esophagus, the more dangerous it becomes. Swelling of the esophageal wall around a hard object not only prevents the passage of food, but may lead to ulceration and a sloughing through either into the trachea or into the mediastinum. The latter condition will certainly result fatally.

A foreign substance lost in the throat which does not enter the esophagus, must enter the larynx. If it should do this and become lodged between the vocal cords, thus preventing air from entering the lungs, cyanosis will develop almost immediately and death soon result, unless prompt relief is offered. If the foreign substance succeeds in passing through the cords and enters the trachea, it will pass at once into either the right or left bronchus, more commonly the right. In this position it will gradually settle into smaller and smaller bronchi, until it may reach the bottom of the lung, *i.e.*, lying in one of the bronchi, may not produce any symptoms immediately. The author has seen a surprisingly large number of cases, where it is almost unbelievable that a foreign body could be in the lung, with so few symptoms present. But sooner or later pneumonia or some other serious lung disease is bound to occur, resulting in death. It is perfectly evident that a lung is not likely to recover

*Read before the Ohio State Dental Society, Dec. 1921.

from a pneumonic process, so long as the foreign substance which caused it remains.

Foreign bodies which successfully pass into the stomach will, in all probability, pass on through the alimentary tract, without producing any injury, if properly cared for. A physic, however, should never be given. Heavy food, such as bread, potatoes and meat will surround the offending object and prevent it from injuring the intestines.

After this general discussion, the question which naturally presents itself is this: What should a dentist do when an object slips from his fingers into a patient's throat? The back of his chair should be lowered immediately, placing the patient in a horizontal position, thus preventing the gravitation of the foreign body into the esophagus or larynx. Its removal from the throat should then be attempted by means of the finger and a pair of forceps. Turning the patient upon his side may help, but keep him in a horizontal position. If the patient should be unable to get his breath, the foreign body is probably in the larynx. Keep cool, and don't get excited, for if you are excited you will not be able to do the right thing at the right time. Try to dislodge the object with your finger and call for help, if there is none present, for you will need assistance and possibly a witness to verify your statements as to the patient's condition. If you are unable to dislodge the foreign body and the patient has become unconscious, remember he will surely die if he does not have air. This can best be supplied through an opening in the trachea.

A dentist would not be justified in making this emergency operation unless the patient is unconscious and attempting to breathe, with no air entering the lungs. A sharp knife should be plunged through the trachea in the center line about one and one half inches below the Adam's apple. An opening about one inch long should be made, and the knife can be turned sideways to separate the edges of the wound so as to allow the air to enter. A short piece of rubber tubing can be inserted temporarily and artificial respiration resorted to. If the patient revives, call an ambulance and send him to a hospital where the foreign body can be removed and the opening into the trachea can be properly sterilized and closed. Remember that a live patient with a temporary opening in the neck is better than a dead one, although you may have to explain to the patient a little later on what it was all about. But above all things, keep cool!

If, however, the foreign substance cannot be removed from the throat, and it has not produced any immediate symptoms, its exact location should be determined. The X-ray is the only method which is at all accurate for this localization and should be used in all cases.

Foreign bodies which are found in the esophagus or lodged in the lungs should be removed as soon as possible.

To show that foreign bodies can be removed I will cite my own records. I have had, to date, March 10, 1921, three hundred and sixty-eight foreign body cases, with only two deaths and one failure to remove a foreign body. One of my deaths resulted from pneumonia which developed when I failed to find and remove a foreign body from the lung, and the other from edema of the lung, following the successful removal of the foreign body, only two minutes being required for the operation. My failure was to remove a pin from the lungs of an adult. This patient, however, recovered from my operation but later died from hemorrhage immediately following its removal by another surgeon.

The following case is of sufficient interest to warrant its report in detail, since it shows what can be accomplished in an emergency. While it did not happen at a dental operation, the foreign body might just as well have been a tooth as a piece of cabbage.

A child, three years old, had started across the field eating a piece of cabbage heart. The father, who was getting ready to go to town, was watching the child, when it suddenly threw up its hands and fell to the ground. He picked up the child and saw it had choked, placed it in his machine and rushed to the nearest doctor's office, about one-half mile distant. The child had not breathed from the time it had choked on the piece of cabbage until the doctor saw it. He made a plunge tracheotomy at once, and started artificial respiration and the child was soon in good condition. Patient was then brought to my office, a distance of ninety miles, and a rather large piece of cabbage was removed from the upper part of the trachea, just below the cords. The tracheotomy tube was removed and the wound allowed to heal. Patient made a perfect recovery and left the hospital in four days, pulse and temperature normal.

This doctor had been practicing for forty years in a small town and had never seen a case of foreign body in the air passages, but, he evidently had been thinking about what he would do if such a case ever presented itself, for he lost no time in doing the right thing.

The following case, while not an emergency, proved to be a very serious one and deals directly with a dental appliance.

A man, about fifty-one years old, arranged with his dentist to have a bridge made to close the space on his lower left jaw, where the second bicuspid and the first molar had been extracted some time before. After the usual preliminaries the bridge was ready to apply. It was while the bridge was being fitted in place, that it slipped from the dentist's fingers and passed into the patient's throat. Almost immediately the patient felt the gold bridge slip on

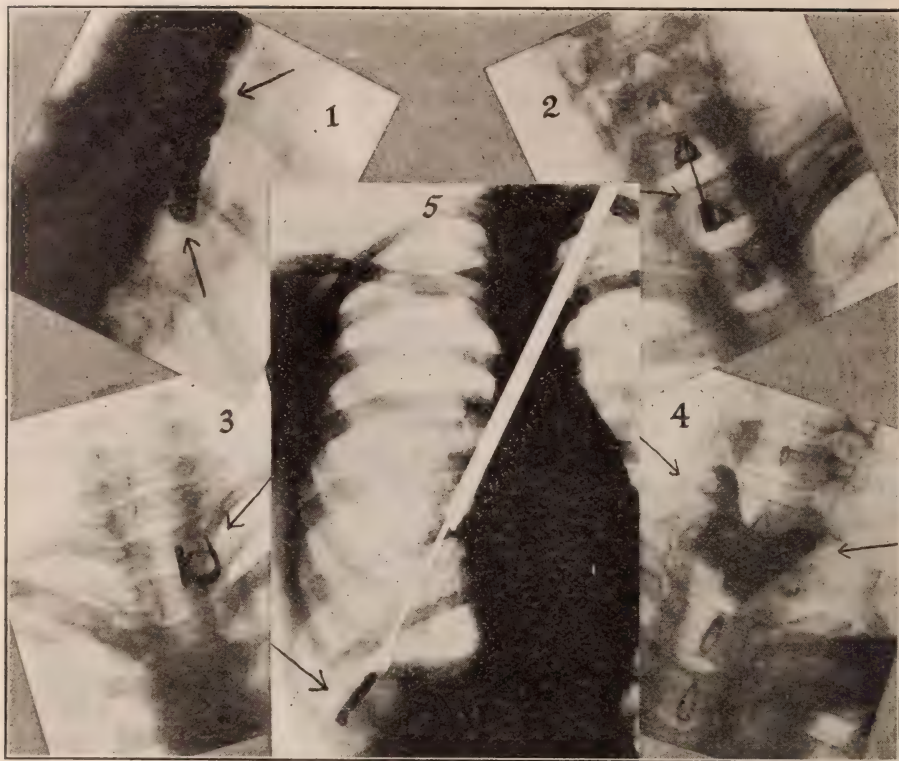


Fig. 1.—Man aged 50. A gold bridge, one and one-half inches long and one-half inch wide, wedged in the right bronchus for six weeks. Successfully removed, patient making a perfect recovery.

Fig. 2.—Man aged 45. Dental broach slipped from dentist's fingers and became lodged in the upper part of the esophagus. Was present forty-eight hours. Patient unable to eat. Under anesthesia esophageal walls relaxed and foreign body slipped into the stomach, and passed in forty eight hours, without difficulty.

Fig. 3.—Girl aged 10. Was having teeth straightened, when a part of the appliance slipped into her throat, while being removed. Lodged in the upper part of the esophagus. X-ray picture, taken at once, as shown above. Some delay was experienced in getting ready for the operation, at which time a second X-ray picture showed the foreign body had become dislodged and passed on down. Later passed from the bowels without difficulty.

Fig. 4.—Man aged 43. Small plate holding four upper incisors became dislodged and was swallowed, while eating a sandwich. Had been present for thirty-six hours. Unable to take even liquids. Foreign body removed without difficulty, under cocain anesthesia.

Fig. 5.—Girl aged 18. "Swallowed" beauty pin ten years before and thought it had passed. Had been treated for tuberculosis because of hemorrhages. X-ray revealed the beauty pin in the bottom of the right lung, lying below the dome of the diaphragm. Previous attempts had been made at its removal. Under anesthesia the bronchoscope was passed as far as it could be, without injuring the lung, which brought the lower end of the bronchoscope tube about five inches from the foreign body. A long pair of forceps was then passed through the bronchoscope and guided through the smaller bronchi towards the foreign body by means of the X-ray, the fluoroscope being used. The pin was grasped by the forceps and removed in four minutes. Patient made a perfect recovery, having no further hemorrhages. Two X-ray machines were used to guide the forceps, in both directions.

down and disappear. There was a choking sensation, which lasted only a few minutes, and then he was all right, except for a heavy feeling in the chest. It was thought that the bridge had been swallowed and since it contained about twenty dollars' worth of gold, the dentist was anxious to recover it. The stools, therefore, were carefully watched, for a period of three weeks, but nothing was found. It was thought that perhaps the bridge had passed and been overlooked, and was, therefore, given up as "lost forever."

About this time the patient went to this family physician, because he had a bad cold which had settled on his chest. The doctor examined him and said that he heard sounds which he had never heard before and stated that it sounded like the air was rushing past something. The patient then informed him of the gold bridge which he had "swallowed" three weeks previously. An X-ray examination was then made and the foreign body found to be lying in the right bronchus.

It was later removed by the author, but not without considerable difficulty, owing to the peculiar formation of the patient's throat and the large size of the foreign body. It measured one and one-half inches long and one-half inch wide at the larger end. The gold bridge, at the operation, was found to be tightly wedged into the right bronchus, with considerable lung change already present. The patient made a complete recovery and left the hospital at the end of one week.

The importance of accurately locating a foreign substance which has been lost into the throat cannot be over-estimated. For, until this is done no reliable opinion can be ventured of the outcome.

As a general rule, however, we might say that every foreign body which lodges in the air passages must be removed without delay, if we are to avoid serious complications and probably death. A foreign body which successfully passes through the esophagus will in all probability pass on through the alimentary tract without causing injury. If, however, the foreign substance becomes lodged in the esophagus, it should be removed as soon as possible to avoid obstruction, starvation and death.

A MODIFIED TENCH METHOD OF CONSTRUCTING FULL UPPER AND LOWER DENTURES*

BY M. H. STEWART, D.D.S., FINDLAY, OHIO.

I HAVE BEEN MOST SUCCESSFUL by following as nearly as possible direct methods. I believe the human jaws to be the best articulators ever made. I first select an upper tray with a handle to it and fit fairly accurately then take an impression with Kerr's compound.

With hot water and alcohol blow-flame I complete the impression according to Tench excepting that I create the pressure with my hands instead of with bite-blocks.

I make the model with Spence plaster.

Form hard baseplate over model.

With patient in chair I wax on centrals, place in mouth and correct to length, median line, etc.; then add laterals and cuspids, getting length, expression and relationship to lower ridge approximately.

Bicuspid and molars are waxed on with approximate relation to lower ridge.

After upper teeth are waxed on with beeswax, using only quantity required to hold them well in place, and yet permit of easy shifting of teeth, with patient's mouth on a level with my eyes I further correct relationship between upper trial plate and the lower ridge.

Wernet's powder holds this trial plate in place during this last operation, and then, for a few minutes, I allow patient to relax, and carry on conversation while I look for improvements in the general set up.

I then take out this trial plate and wax teeth securely with American sticky wax put up by De Sanno & Hoskins.

Take snap impression of lower in compound, covering condyles. Pour up in ordinary plaster. Mold modeling compound bite-block to this model. Shape and trim for bite so that it fits the ridge well and comfortably, estimating height of block so that when patient shall bite into it a good imprint of cusps of teeth on upper trial plate is obtained.

Put upper trial plate in position, using Wernet's powder. Heat occlusal surface of bite-block with blow-flame, quickly dip in hot water, place in mouth, telling patient to bite slowly into same. By practice I have become able to plan height of block and heat occlusal surface so that patient comes to a stop in the bite about where I want it. Chill and remove bite block.

*Given as a clinic at Ohio State Dental Society, Dec. 1921.

Place back in mouth. Test for protrusion by having patient put point of tongue back and up in roof of mouth, if possible to back of trial plate, opening and closing with tongue in this position. If protrusion is evident, remove, resurface and heat bite-block as before, place in mouth and have patient bite with tongue up as before described.

I get a large percentage of correct bites without instructing patient how to bite, but use the tongue-method to prove the work and to correct it.

Satisfied with the bite, I mark lower lip-line at rest, remove trial plate and block and place on articulator, using lower snap model.

Set up lowers with anteriors not any higher and preferably just a little lower than level of lower lip. Bicuspids and molars are set low, hugging the ridge. In most cases liberal grinding of teeth next to ridge is necessary. The uppers are now corrected being lengthened and otherwise made to accommodate the lowers.

Prepare upper case for vulcanizing as follows: Pour up in lower half of flask, using Spence plaster. When sufficiently set to handle, burnish tin-foil on lingual surface of wax, allowing furled edges next to teeth for engaging next pouring of plaster. Also, burnish tin-foil on labial surface of wax. Varnish and pour upper half of flask as usual, using Spence plaster. In packing use no foil on the model.

This is Dr. Gysi's method of controlling the shrinkage of rubber.

Vulcanize and finish upper well enough to be put in mouth.

Put upper case in position.

Place lower trial plate in mouth and make necessary corrections. Allow patient to wear it long enough to relax, engage in conversation, get up and walk around, biting lowers into good contact with uppers. Remove and vulcanize lower; finish so it can be put in mouth. Muscle-trim liberally, trying in mouth until there is no muscle-lift. Reline by Tench method with upper case in position.

During the relining operation the patient will bite and hold the lower naturally, and the operator being skillful in heating and placing the compound, the closed-mouth adaptation is obtained between the upper and lower dentures.

Should the upper not fit satisfactorily, which is seldom, I reline it after completing the reline of the lower.

As between the various methods of impression taking, I adhere religiously to the Tench method in principle, because I believe that if the operator is in love with the work he will, after sufficient faithful application, so get the "feel" of the materials at his finger-tips and come to know just how hot and where to heat compound, dip it in water of right temperature, at just the right time, and get it to place in the mouth at the proper interval, so that the material is finally shaped to the tissues without undue pressure at any point,

so that the displacement of tissue is not overdone, but sufficient to permit of finished plate, which has good suction under biting stress equalized over the entire surface.

The lower reline impression being completed so that all muscle-pull is eliminated, satisfactory suction obtained on lower in the compound, a proper peripheral film of wax will complete the seal without resorting to harmful post-damning or subsequent damning by the patient.

In any event I agree with Dr. Tench that even if in a percentage of cases should the suction decrease from absorption, the new plate-wearer has been tided over the critical period, and becoming experienced, will in most cases not complain of loss of suction, which in my opinion, if the case has been done well, will be negligible.

I shall always be most grateful to Dr. Tench who has given his valuable system to the profession and also to Mr. Dresch, of the Dresch Laboratories, for many valuable things I have learned from him.

QUICK REPAIR OF PLATE*

BY R. E. PEELE, D.D.S., WILMINGTON, O.

Heat a little Mellott's metal on spatula, and fuse around the pins on the tooth. Take a No. 7 bur and make retentions in the plate. Fill the retentions with Mellott's metal, put the tooth as near to place as possible, and with hot spatula fuse the metal that was on the tooth with the metal in the retentions in the plate, gently pressing the tooth into place as the metal^{*}fuses.

*Given as a clinic at Ohio State Dental Society, ⁵Dec. 1921.

THE SELECTION OF THE ANESTHETIC FOR
INTRAORAL SURGERY*

C. H. BURMEISTER, D.D.S., CINCINNATI, OHIO

ATTENDING DENTAL SURGEON TO THE CINCINNATI GENERAL HOSPITAL

THE ACTUAL ADMINISTRATION of an anesthetic for dental and oral surgery is far different than one would suppose from reading the regular text-books on the subject. Conditions peculiar to operations in the mouth change the rules for the administration of anesthetics for operations on other parts of the body. The admixture of variable quantities of air, the presence of profuse hemorrhage, the small field of operation and the highly specialized sensitive organs demand a technic quite different. In the following paper an attempt will be made to review briefly the indications for various anesthetics and their several uses in operations which are performed intraorally.

THE ROLE OF LOCAL AND CONDUCTIVE ANESTHESIA

Local and conductive anesthesia are especially indicated in those operations where careful technic is required. Such an operation as the removal of the impacted third molar seems to be a direct indication for the use of novocain. Some one has said "the more difficult the impaction the more conductive anesthesia is indicated." By the use of the mandibular injection, supplemented by the buccal injection, a painless operation can be performed, one which does not predispose the patient unnecessarily to the risk of ether or chloroform. The field of the operation is clear from blood, and instead of being subjected to the usual nauseating recovery, the patient can be discharged almost immediately. The great majority of impacted teeth operations are not of such consequence as to require the usual hospital routine. Correct angles by the radiograph change many so-called hospital cases into simple extractions.

TROUBLESOME OPERATIONS

One of the most troublesome operations the dentist has to perform is the removal of pulpless teeth. It has been estimated that a vital tooth can be compressed one-tenth of its bulk and return to its original form. A tooth that has been divitalized can be compressed only two per cent. of its bulk. Surrounding the brittle pulpless tooth is a condensing osteitis of the process which makes a far more difficult environment than normal. McGee has likened the operation to "the removal of a fossil fish from a piece of granite." Henahan has described the removal of such a tooth as the most difficult he has to perform. The careful turning back of the flap, the removal of the buccal plate, the tedious

*Read during the Seventh Annual Meeting of the Interstate Association of Anesthetists in Joint Session with the Odontological Society of Western Pennsylvania.

dislodging of the fractured apical third by the chisels requires ample time to do the operation without unnecessarily damaging the surrounding structures. This is another direct indication for the use of novocain.

In the removal of infected granulomatous areas about the roots of pulpless teeth, Hartzell says it is his custom to remove the entire tooth, and by the use of adrenalin and packs see to it that every particle of the granulomatous tissue is removed from the periapical region. The use of general anesthesia seems especially not indicated in this operation.

A troublesome complication in the removal of the superior molar teeth is the possibility of forcing them into the cavity of the antrum. From anatomical specimens it has been shown that it would be impossible to extract certain roots without entering the cavity. When this occurs the easiest and best way is to remove the buccal plate of the alveolar process, after first making a flap, and remove the foreign body by curette, wire loop or by irrigation. The flap can then be brought down and an opening of long standing be avoided. Such an operation could hardly be performed except under a local anesthetic.

Another operation which is being done for prosthetic purposes is the one known as alveolectomy. The principle involved is the removal of as much of the alveolar process as would eventually be removed by nature in the process of resorption. The technic consists in raising a muco-periosteal flap following the extraction of the teeth and with the rongeur forceps excising the buccal and labial alveolar plate and as much of the septal bone as is necessary for the contour. The lingual plate is left as it appears or is smoothed off. If an impression is desired the flaps are sewed together. The men who are doing the work along this line are almost unanimously in favor of local anesthesia in preference to general anesthesia. This allows the impression to be taken immediately after the operation, which would be otherwise impossible.

Conductive anesthesia is used to advantage in the reduction of fractures, where the break is distant from the point of injection. Relaxation of the muscles is gained without the usual nausea and vomiting following the use of a general anesthetic.

The use of suggestion when local anesthesia is used is of inestimable value. Many operations can be successfully performed under this form of anesthesia by the careful operator where one possessing equal skill but less tact, is doomed to failure.

ADVANTAGES OF GENERAL ANESTHESIA

Nitrous oxid-oxygen is the safest of all general anesthetics in the hands of the expert and the most dangerous in the hands of the unskilled. In the every-day practice of exodontia and oral surgery nitrous oxid-oxygen is somewhat limited in its use. It is especially adapted to short operations. In the extraction of vital teeth, not liable to fracture, it is an ideal anesthetic. It is also especially indicated in lancing abscesses and the extraction of abscessed teeth. The method of nasal adminis-

tration is most frequently used and, allows the operator a clear field of operation. For children and neurotic patients it is the anesthetic of choice owing to the rapid and pleasant induction.

This form of anesthesia has the advantage over local in cases of alveolar abscess as it eliminates the possibility of the infection being infiltrated into the surrounding tissues.

PROPHYLAXIS OF ASPIRATION

Dr. Carl Hedblom, in the *Annals of Surgery*, May, 1920, describes some cases in which particles of teeth were inspirated during extraction, resulting in the death of the patient in several instances. It is of paramount importance that every available method be used to prevent the entrance of such foreign bodies. Perhaps the best is the packing of the throat method advocated by Winters. Gauze and cotton packs are made by laying a large layer of cotton between two layers of gauze and cutting into four inch squares. A cord about eighteen inches long is tied through the middle of each square. This serves to prevent the passage of the pack into the pharynx and also serves for its easy removal. The patient is anesthetized with the nasal inhaler and the mouth gag is applied and opened when the patient is completely anesthetized. A tongue depressor is introduced and the base of the tongue carried forward. The gauze pack, just described, is passed over the depression and is held firmly in place by the tongue when relaxed. The pack serves two main purposes. It prevents the entrance of foreign material, such as tooth roots, crowns, fillings and blood into the glottis and it also acts as a valve which prevents breathing through the mouth. There have been cases, in which gauze packs not so constructed, have been drawn into the glottis under forced inspiration and removed only with great difficulty. The increased number of accidents of this kind and the inspiration of foreign particles require special attention along the lines of prevention.

ANESTHESIA FOR PROLONGED OPERATIONS

In long continued operations such as the removal of large cysts of the upper jaw, cysts of the ramus, resections, hare-lip and cleft palate, ether is the anesthetic *par excellence*. In intra-oral operations, in which the mouth should be free from anesthetic appliances, intra-pharyngeal anesthesia by the vapor method is used. This form of anesthesia is also ideal where the antrum or nasal fossa is opened. For any operation in which hemorrhage is profuse ether vapor is preferred. The packs in the mouth need to be changed so often that it is quite impossible to procure a smooth anesthesia using nitrous oxid.

A factor which must also be considered in a dental practice is the patient's preference for an anesthetic. When the operation can be performed equally successfully under local or general anesthesia the feelings of the patient may well be respected.

In conclusion, the point which the author has desired to emphasize

is that local and general anesthetics have certain well-defined fields for their administration, and that certain operations can be better performed under one than the other. Only by employing the indicated anesthetic can we give our patients the best service and protection. The correct selection of the anesthetic is one of the chief factors in the successful operation.

THE BUFFALO STUDY CLUB

Beginning on the following page we give considerable space this month to a report of a clinic given by the Buffalo Study Club of Dental Engineering, covering certain important phases of denture construction, hoping that such publication may arouse wide discussion upon this important subject. At no time in the history of dentistry has there been such wide and intelligent interest in improved methods in denture prosthesis; and the able men who have contributed so greatly to recent advances in this branch of dentistry are invited to discuss this contribution through the pages of THE DENTAL SUMMARY.

DENTURE CONSTRUCTION*

INTRODUCTION

By E. J. Farmer, D.D.S., Buffalo, N. Y.

IT WILL BE OUR ENDEAVOR to demonstrate and explain the practical application and interpretation of denture construction as we see it.

It has long been recognized that the prosthodontist cannot accept average anatomical measurements for artificial denture construction, and that he must build each individual case to accommodate the peculiarities of the patient.

The object of the clinic by members of the Buffalo Study Club of Dental Engineering is to give a demonstration of denture construction which complies with the individual requirements of the patient. The clinicians will take up the work from the point where the impressions, casts and the occlusal rims have been prepared, ready to take the bites.

Mr. R. L. Hanau, a mechanical engineer of Buffalo, has evolved a technic and an instrument which permits us to execute our work in a simple manner, yet accurately. Many good points given to us by Drs. Snow, Gritman, Gysi, Tench and others are fused with added new features in this technic.

The clinicians will give the practical application of the theories involved and their effort will be to explain the problems by clinical demonstrations and models.

The technic follows:

ANATOMICAL REQUIREMENTS

POSITIONAL RELATION

Determined on the *patient*.

1. Casts made
2. Occlusal rims of compound
3. Central occlusal bite taken
4. Right lateral bite taken
5. Left lateral bite taken
6. Condyles marked
7. Face-bow applied

Established in the *Articulator*

8. Articulator set in central occlusion*
9. Face-bow extensions adjusted
10. Face-bow mounted
11. Upper cast mounted
12. Lower cast mounted in central occlusal relation to upper.

ARTICULATOR ADJUSTMENTS

13. Incisal pin removed
14. Center socket E loosened
15. LEFT lateral bite inserted
16. Right condyle lever A1 set
17. RIGHT lateral bite inserted
18. Left condyle lever A2 set
19. Right condyle plate F1 set
20. Center socket E locked and position recorded
21. Center socket E loosened
22. LEFT lateral bite reinserted
23. Left condyle plate F2 set
24. Center socket E locked and position recorded
25. Average position of E selected
26. Incisal pin replaced.

*A clinic by members of the Buffalo Study Club of Dental Engineering.

* Set levers A1 and A2 at 25 ; high edge of condyle plates F1 and F2 to the outside laterally; incisal pin H centers in cavity of guide G with five to six threads exposed above locknut J; center socket E is locked at about middle of slot.

TECHNICAL REQUIREMENTS

- | | |
|---|---------------------------------------|
| 27. Selection of teeth | 30. Teeth set-up in central occlusion |
| 28. Set-up rims built | 31. Incisal guide G selected |
| 29. Bite opened 1 mm
(about one turn of G) | |

ABBREVIATED SUMMARY OF SUBSEQUENT OPERATIONS

32. Check central occlusion in the mouth with teeth in wax
33. Take right and left lateral bites with teeth in wax for checking adjustments of articulator.
34. Correct errors, if any, by readjusting articulator
35. Articulate teeth in articulator
36. Recheck articulation in the mouth
37. Record condyle inclinations of levers A1 and A2 and of center socket E
38. Remove lower cast and waxed up denture and build up plaster high enough to get impression of upper teeth for resetting upper denture into same positional relation after vulcanization, and for record
39. Vulcanize and finish upper and lower denture
40. Take compensating bite in central occlusion in the mouth
41. Place upper plate into impression, made under No. 38 and cast-in
42. Adjust lower to upper by compensating bite and cast-in
43. Check articulation in the mouth and grind-in in articulator

We shall now proceed with the clinic as outlined.

THE POSITIONAL RELATION OF THE JAWS

By H. E. Reynolds, D.D.S., Buffalo, N. Y.

I WILL START OUR CLINIC at the point indicated by Dr. Farmer. We have prepared the occlusal rims and contour models, determined central occlusion and have taken a right and left lateral bite.

These occlusal rims do not differ in any essential from those we all are familiar with. They are but a set of preliminarily accepted base-plates, which fill the space at our disposal for the artificial dentures to be built. These rims serve primarily to establish the positional relation of the jaws to each other in the patient's mouth, and to re-establish the same relation in the articulator which is to be the patient's dummy. We are demonstrating with the Hanau Articulator shown in *Fig. 1*.

The central occlusion and protrusive wax-bites have been used extensively heretofore. The technic, which is the object of the clinic, employs three bites, namely: *Central Occlusion, Right Lateral Occlusion and Left Lateral Occlusion*. The lateral wax-bites are used because the accepted condyle head-centers make excursions, which permit us to conveniently determine the inclinations of the condyle movements for the adjustment of the articulator. We advise to take these bites under muscular tension, which means that the patient should bite fairly hard.

The *central occlusal bite* establishes the relation of the jaws in central occlusion, which is the position we start from. We may establish central occlusion by the horse-shoe method with good results; the bite locks will serve the same purpose. In central

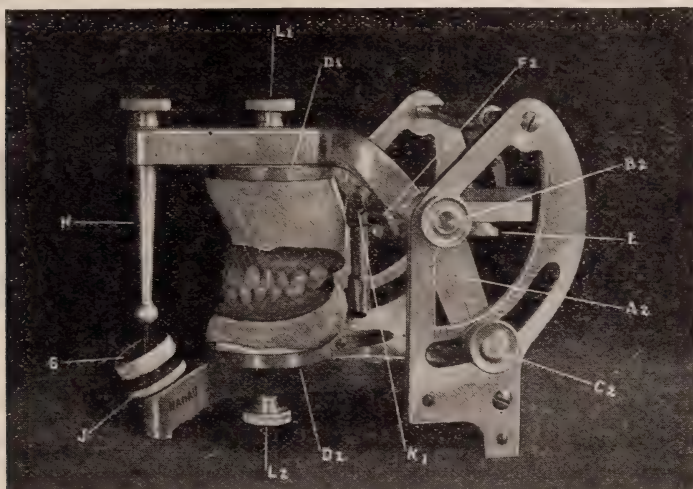


Fig. 1

A1 and A2 right and left Condyle Levers. B1 and B2 right and left bores for Face-Bow. C1 and C2 right and left locknuts for Condyle Levers. D1 and D2 Cast plates. E Center Socket. F1 and F2 right and left Condyle Socket Wall Plates. G. Incisal Guide. H. Incisal Pin. J. Locknut for Incisal Guide. K1 and K2 right and left Condyle Socket Supports. L1 and L2 Locknuts for Cast Plates.

occlusion the condyle heads are resting in the socket of the glenoid fossa and in this position the maxillary and the mandibular condyle lines are accepted to coincide. It is the only position in which we can conveniently relate both jaw members to one common line. This is of importance for the face-bow technic which will be explained by Dr. Greenfield.

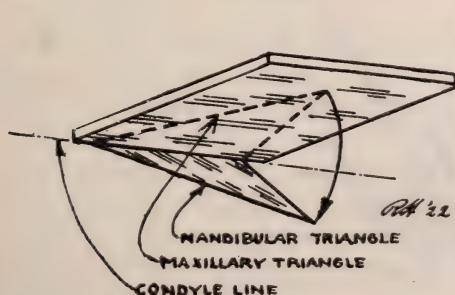


Fig. 2

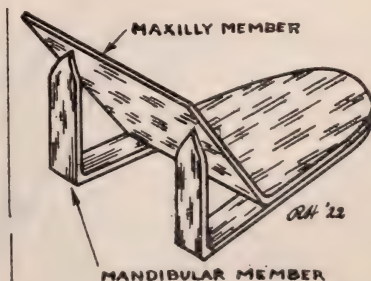


Fig. 3

This simple model (Fig. 2), illustrates the coincidence of the mandibular triangle in central occlusion. When opening, we are unfolding, so to say, the triangles about the condyle lines as a hinge.

Performing protrusive and lateral movements, the maxillary and the mandibular condyle lines become separated.

This model (*Fig. 3*), may serve to more clearly illustrate the meaning and justification of lateral wax-bites. These plates represent the maxilla and the mandible, schematically of course. The centers of the condyle head centers are at the ends of these extensions, coinciding with these corners and touching the maxillary plate at points representing the accepted centers of the condyle



Fig. 4

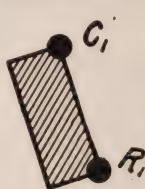


Fig. 5

pocket. The bites are made of compound for this demonstration. Inserting the central occlusal bite, the condyle centers still point to these marked points, C_1 and C_2 in *Fig. 4*, which are the centers of the sockets. The insertion of this bite incurs an opening of the jaw members with the condyle-heads remaining in the socket.

In left lateral occlusion, we have the right condyle head moving forward and the left laterally. The insertion of this bite, which is the left lateral bite, demonstrates this very clearly. *Fig. 4* shows the condyle surfaces of the model viewed from the back. The positions in which the ends of the extensions locate themselves when the left lateral bite is inserted are marked L_1 and L_2 .

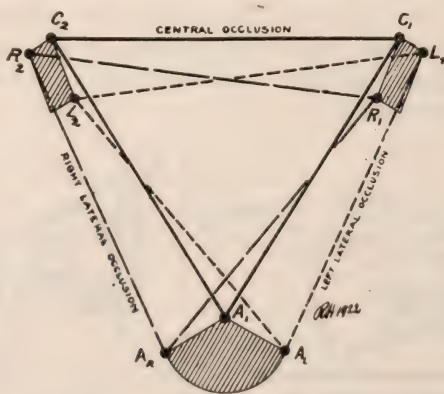


Fig. 6

In right lateral occlusion the left condyle head moves forward, while the right condyle head goes laterally in the fossa (Fig. 5). Here I am placing the right lateral bite between the jaw members of the model. Note the excursions of the condyle centers to points marked R_1 and R_2 .

In order to further illustrate the meaning of the wax-bites, refer to the drawing, *Fig. 6*. It shows the mandibular triangle in the three positions described: *Central Occlusion, Left Lateral Occlusion, Right Lateral Occlusion*. These three points determine the condyle surfaces in the articulator.

I trust that my demonstration has brought home the usefulness of the wax-bites, so important in our clinic. They serve to utilize and register the positional relation of one jaw member to the other.

The positional relation of the denture as a whole to the anatomical condyle line is determined by means of the face-bow

Due to the fact that plate work is an important part of our professional activity, we feel that each individual dentist should do his best to spread the knowledge of existing good methods and encourage improvements on them. I shall be pleased if I have succeeded in demonstrating and explaining the true meaning of the wax-bites, namely, that their purpose is to register the positional relation of one jaw and all its points to the other jaw.

Dr. Greenfield will dwell on that part of the technic which pertains to registering and establishing the positional relation of both jaw members to a common condyle line.

THE POSITIONAL RELATION OF THE DENTURES TO THE CONDYLE LINE

By W. C. Greenfield, D.D.S., Buffalo, N. Y.

DR. REYNOLDS HAS GIVEN the preparation and the making of the wax-bites for recording the positional relation of one jaw member to the other; in other words, we have registered occlusions.

The usefulness of these registrations for accurate articulator technic is problematical unless we establish in the articulator the same positional relation of the denture as existed in the patient. Then we really have the same occlusions in the articulator as existed in the patient.

This was made possible by the face-bow originated by Dr. Snow. Hanau sees in the face-bow one of the finest contributions to the dental metrology. He defines the face-bow as an instrument which serves to *establish* the positional relation of the space in the month of the patient to the maxillary condyle line, and *to re-establish* this positional relation of the space in the condyle line of the articulator. This interpretation very concisely defines the Snow face-bow technic already practiced by many prosthodontists. The face-bow I am using here (*Fig. 7*), is designed by Hanau. Essentially it is like the Snow face-bow.

Before demonstrating the application of the face-bow, I wish to point out, that it is theoretically immaterial whether we register

both occlusal and contour rims waxed together in central occlusion, or whether we register only one jaw member in central occlusal position, and re-establish central occlusion when mounting the rims onto the articulator. At times it is more practical to wax one occlusal rim (preferably the maxillary) to the mouthpiece. The advantage of attaching the maxillary rim only to the mouthpiece

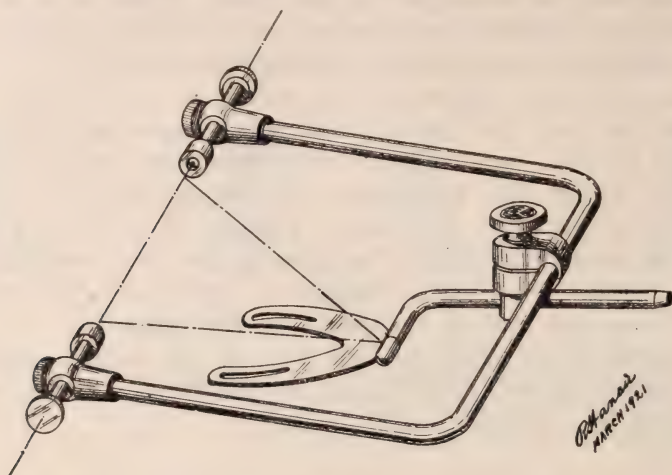


Fig. 7

is two-fold. *First*, the maxillary part of the denture always remains in a definite relation to the *maxillary* condyle line, the relative base line in the patient and the articulator, and *second*, the handling of one rim on the mouthpiece of the bow disposes of part of the bulk, thus making manipulation in the mouth more convenient.

After I have waxed the mouthpiece to the maxillary rim in the conventional manner, I insert both rims into the mouth of the patient and tell him to bite sufficiently hard to avoid displacement. We then draw the bow over the face of the patient, permitting the extension of the mouthpiece to enter the hole of the clamp. Special care is taken in bringing the ends of the extensions of the bow over the previously-marked positions of the condyle centers, which are about one-half inch anterior to the auditory canal in a direction towards the corners of the eyes.

After positioning the face-bow, with the extensions preferably in a symmetrical position, all screws are locked tightly. I see that the extensions when released remain over the marked positions of the condyle centers when the face-bow is supported solely by the mouthpiece waxed to the occlusal rim in the mouth of the patient.

This completes the face-bow measurement made on the patient. I will now show how the face-bow registration is transferred to the Hanau articulator. It is an exceedingly simple affair. Set the

extensions to read 7 on the outside then slip them into the bores of the nuts marked "B" *Fig. 1*, and suspend the bow with the aid of a soft copper wire in a position bringing the future central incisor contact point *approximately* opposite the groove cut around the incisal pin. Mount one-fourth inch too low, rather than too high, and do not forget to lock the incisal guide in a position, exposing about six threads above its locknut ("J" *Fig. 1*). Always provide sufficient room to mount the lower occlusal rim and cast. Thus, you will reserve ample leeway for closing the bite, should the necessity arise. In this position mount the upper casts seated and waxed in the occlusal rim, onto the articulator, using as is customary, plaster of Paris. The lower cast is mounted upon the lower jaw member with the upper and lower occlusal rims waxed into the accepted central occlusal position. Thus the mounting is completed and we may proceed to the next step which Dr. McCarthy will elucidate.

CONSIDERATION OF THE LATERAL RELATIVE MOVEMENTS

By A. J. McCarthy. D.D.S., Buffalo, N. Y.

HERE WE HAVE THE OCCLUSAL RIMS filling the space which the finished denture will occupy. The face-bow determined the correct positional relation of the maxillary rim to the condyle line, and central occlusion determined the positional relation of one jaw to the other, for a position in which the maxillary and mandibular condyle lines coincide. Thus the occlusal rims are in the same relation in the articulator as they were in the patient's mouth.

From experience we know that in practically every case there is a variation in the inclinations of the condyle paths. Therefore it is necessary to determine this inclination and transfer it to the articulator. I will show what we may expect if we do not consider these important measurements.

For this purpose we will use this device and consider it an articulator, letting this point represent the condyle head (C) and these zig-zag contours (UD and LD) the occlusal surfaces of the teeth of the upper and lower denture. You are referred to *Figures 8A, 8B, 8C and 8D*.

We will say that the articulator condyle head moves on an average 30° condyle inclination. When set at 30°, we have perfect central occlusion and while protruding we have perfect articulation. This would be the least we may expect of a denture, set-up and ground-in in any articulator.

Now suppose that we transfer these teeth to a patient who has a steeper condyle inclination. He will still have perfect central occlusion, but when protruding there will be an anterior interference

(Fig. 8C). Suppose we transferred the denture to a patient who has a flatter condyle inclination; then again we would have perfect central occlusion, but in protrusion we would find a posterior interference (Fig 8 D).

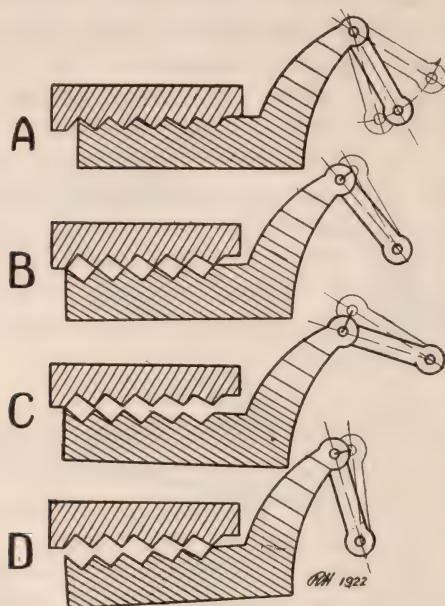


Fig. 8

- A—Central Occlusion.
- B—Protrusion, for 30° Condyle inclination.
- C—Protrusion, for too steep an inclination.
- D—Protrusion, for too flat an inclination.

Should we attempt to grind off these interferences, then there will be a loss of contact in the ground-off region when the teeth are brought back into central occlusion. Hence, a tipping of the plates is invited at central occlusion, while it would be eliminated in protrusion, where it was imminent.

This device only demonstrates what happens on one side in a symmetrical denture; but as a rule we find different inclinations on both sides in most of our cases. The difficulties we are up against if we do not adjust our articulator to conform to the individual requirements of our patient, here become readily apparent.

What I am going to do in the articulator is equivalent to adjusting the instrument to comply with three positions of the mandible, namely: *Central Occlusion, Left Lateral Occlusion, and Right Lateral Occlusion*. Thereby the articulator will be able to reproduce intermediate movements as they are performed by the patient.

The occlusal rims are already mounted with the face-bow in correct central occlusion. By means of these two lateral bites, we

will place them into lateral occlusion, so that the teeth will not only occlude but articulate as well.

Remove the incisal pin (*Fig. 1*). Loosen the back center nut (E *Fig. 1*) slightly, and insert the left lateral bite between the rims, establishing a left lateral occlusion. In left lateral occlusion the *Right Condyle Head Moves Forward*, while the left goes laterally. The instrument is adjusted to the forward excursion of the right condyle head by swinging the lever A_1 , on the right side of the articulator, until the rims seat themselves into the wax-bites. Observe the changes produced by swinging the lever. They fit correctly, say at 20° for this side, and I gently lock these nuts C and B (see *Fig. 1*, opposite C_2 and B_2). The *left condyle head has moved laterally* as it does in the anatomy. In order to have the articulator in the same lateral direction, the little surface (F_2 *Fig. 1*) is adjusted by turning it until it serves as a guide in lateral movement. Then set the locknut. As a rule the high edge is to be inside, never to the bottom, very seldom to the top.

We will now give consideration to the relative magnitude of the lateral movement of points in the molar region and turn to the back center (E *Fig. 1*), which so far was loosened. We slide it back and forth until the posterior part of the rims seat themselves correctly in the bite. We keep in mind that the back center socket was set at the fourth line for the lateral bite and loosen it again.

Now we take care of the other side and insert the *right lateral bite*. The lever (A_2 *Fig. 1*) on the left side is set to conform to the *forward excursion of the left condyle head*, by swinging the left lever A until the rims fit. For the left forward excursion of the condyle head the occlusal rims seat themselves at, say 30° ; so here we lock the nuts B_2 and C_2 . Now we adjust the surface F_1 to follow the *lateral movements of the right condyle head*. Lastly, go back to the center socket and then you will find that the posterior part of the rims fit best into the bite when set at the fifth line. In the left lateral bite it was set at the fourth line. The difference is very small, so we may select an intermediate back-center position at four and one-half for both sides. If there should be a greater difference, let us say three on one side and seven on the other, then we should set-up and grind-in the teeth separately for each side. *The close adjustment of this socket becomes more important AFTER the teeth are set-up in wax and checked in the mouth of the patient.* It will suffice in practice to start this socket in an average position. The practical value of making a close adjustment to accommodate the relative magnitude of the lateral movement in the posterior region becomes evident, particularly when grinding-in the masticatory surfaces after vulcanization of the dentures.

Now the articulator is adjusted to comply with the anatomical requirements of the patient. The technical requirements, such as

the peculiar characteristics of the masticatory surfaces and the type of teeth we select, also have to be considered for a complete adjustment of the articulator.

Dr. Snider will give a short review of that part of our clinic.

THE FUNCTION OF THE INCISAL GUIDE

By George Snider, D.D.S., Buffalo, N. Y.

DR. MCCARTHY HAS JUST DEMONSTRATED the adjustment of the Hanau articulator to conform to the anatomical requirements of the patient. He indicated the necessity of also adjusting to comply with the technical requirements. The technical requirements are taken care of by the selection and adjustment of the *incisal guide*.

In order to give a clear understanding of the incisal guide function, I will have to go somewhat into the detail of articulation, because this incisal guide is nothing but a surface in the mechanism which provides guidance for the incisal pin in harmony with the masticatory surfaces.

In practically all dental clinics and meetings, much discussion arises concerning "Occlusion" and "Articulation." There are various well-defined and acceptable views of what constitutes occlusion and articulation. The variance in these views pertains to details.

We have seen fit to define occlusion and articulation as follows:

OCCLUSION consists of multiple- (at least three) point contact of the opposing masticatory surfaces. *ARTICULATION* is the change from one occlusal position into another while the opposing masticatory surfaces maintain contact; for instance, from protrusion into central occlusion.

We distinguish three kinds of articulation, namely: 1—Anatomical, 2—Semi-anatomical, 3—Mechanical, or articulator articulation.

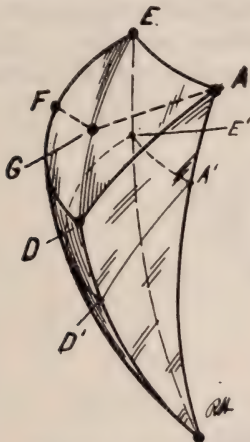
In partial denture construction where teeth remain in the upper or lower, for instance, the incisors, we must provide anatomical articulation in the final result, because we are guided by the condyle paths, and, in the front, by the remaining teeth. The three guides are all that is necessary to position and guide an object in space; in our case, to guide the mandible in relation to the maxilla.

In full denture construction, we have the inclinations of the condyle paths given, but select the formation and position of the teeth, which means that we select a third guide. Therefore, we are establishing semi-anatomical articulation. Semi-anatomical articulation does not necessarily reproduce the original natural articulation; at times it may be an improvement on it, for few natural

dentures possess a three- or multiple-point contact, such as we prosthetists would accept for balancing contact in artificial dentures.

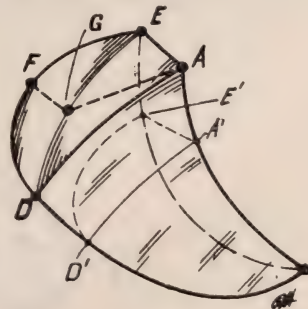
Articulator articulation is practically worthless and should be discarded, for it refers to that kind of articulation which fits an articulator mechanism only; it is, at its best, a speculative attempt to fit the patient.

The incisal guide in the articulator serves to direct a third point of one articulator jaw member in its movement to the other. The other two points are guided by the adjusted condyle surfaces.



MEDIAN BICUSPOID

Fig. 9



MOLAR BICUSPOID

Fig. 10

The advisability of using a third definite mechanical guide is quite evident, if we consider that the artificial teeth are set up in wax, which does not provide a solid support for the upper articulator jaw member, with the attached bulk of plaster of Paris, nor will it resist all forces we are apt to apply in operation. We may dispose of the incisal guide after vulcanizing the teeth to the plate, for they are then securely held in place to serve as a guide.

The relation between incisal guidance and tooth guidance is reciprocal. Accepting the three kinds of articulation, namely: *Anatomical*, *Semi-anatomical*, and *Mechanical or Articulator articulation*, we may also distinguish between three distinct functions of the incisal guide: To establish anatomical articulation, which is essential in partial denture construction, when we must provide guidance to comply with the fully-given anatomical requirements, which are the condyles and the remaining teeth in the mouth. This is accomplished most conveniently by filling the incisal guide with soft wax. The articulator with correctly-adjusted condyle movements, performs anatomical articulation with the artificial teeth over the natural teeth present. The movement of the incisal pin is traced in the soft wax and the formation dug out is rein-

forced by a thin metal sheet (No. 7 block tin) making an efficient and durable incisal guide. This would not be necessary if teeth were present in both jaws and the casts were made of hard metal, which could serve as a substantial guide. For those natural teeth which occlude with the porcelain teeth, it is best to run of some fusible metal or pack with amalgam to make a durable surface for grinding during the various movements of articulation.

We have more latitude in the selection of incisal guide in full denture construction, for here we can harmonize the surfaces of all the teeth to accommodate the given or accepted anatomical requirements with the type of the masticatory surface we select. An incisal guide in full denture construction, is selected to harmonize pri-

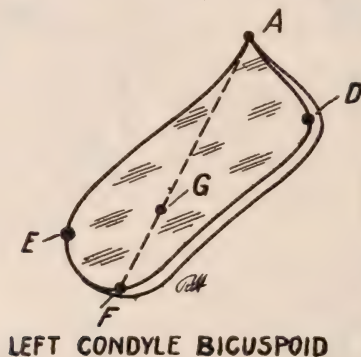


Fig. 11

marily with the overbite and the inclination of the lingual surfaces of the upper incisors, which we have decided to apply. The correctness of the selections is checked by executing articulation and observing whether the teeth are lifted out of contact when guided by the pin. In such a case a shallower guide should be used. If the pin is lifted out of contact by the teeth, then a steeper guide should be selected. It is immaterial whether we select the incisal guide or the tooth formation first; the one has to be accommodated to the other and in the end we must arrive at an acceptable arch form.

Bicuspid articulator articulation accepts an arbitrary incisal guide as well as an arbitrary or average condyle movement, without regard to the individual requirements. The mechanical function of the guide is the same as before.

Hanau relates the freedom of mandibular movement to bicuspid movement of the various mandibular points. The incisal guide is nothing but the superior surface of one particular bicuspid and it has to harmonize with the remaining bicuspids.

No doubt all are familiar with the Gysi Gothic Arch. It represents a projection of the freedom of movement of a point on the median line of the maxillary denture in relation to the mandible.

A reversal would be the freedom of movement of a point on the median line of the mandible in relation to the maxilla.

Mr. Hanau has extended this figure, which is two dimensional, into a solid which is three dimensional. On account of the similarity of this figure to a bicuspid, he called it the "Bicuspid." We are thereby enabled to include the opening component in the investigations of mandibular movements during the performance of mastication.

This bicuspid model (*Fig. 9*) is symmetrical and represents the freedom of movement of a point on the median line of a normal, symmetrical, mandibular denture in relation to the maxillary; for instance, the contact point of the lower central incisors.

Starting in central occlusion (A) in a normal denture, we can move the mandibular point forward into the edge-to-edge bite positions which are found on the line (DGE). From here we can go still further forward into the extreme positions given by the line (DFE). A true protrusion takes place along the line (AGF). The superior surfaces of the bicuspid (ADGE and EDGF) have various inclinations for different dentures.

From central occlusion (A) we can move the mandible laterally to the right and to the left, arriving at the extreme positions (D and E). From any position we may open into the extreme, arriving at the point (H), when we can neither protrude nor move laterally.

The superior surface of the bicuspid represents the freedom of movement during articulation. The usual limit of habitual masticatory movements extends from the superior surface ADEF downwardly within the space marked off by the wire ($A^1 E^1 D^1$).

Bicuspids for points not in the median line become distorted. This bicuspid (*Fig. 10*) is characteristic of one, for a point in the molar region.

The bicuspids lose their characteristic form for points approaching the condyle. The condyle bicuspid has a formation similar to this model, (*Fig. 11*). It is the bicuspid for the center of the left condyle head. The thickness or height of this figure (*Fig. 11*), represents the freedom of movement of the condyle center in a direction perpendicular to the condyle surface, which means intrusion and extrusion. This space represents the limit within which the condyle head may move. Forcing the condyle head beyond this space, will result in a bone regeneration or a bone absorption. *SOMETIMES* we want to produce this change, but then we should know in advance what we intend to do and how to do it. For that purpose we need a fully and readily adjustable articulator which can meet all conditions and requirements of nature or those decided upon by the practitioner. I personally prefer the Hanau

articulator because it enables me to readily comply with all practical and theoretical requirements.

Dr. Chappelle will demonstrate the practical results achieved by a series of dentures which confirm our analysis.

THE RELATION OF ARCH FORM, CUSP FORM AND CONDYLE
INCLINATIONS SHOWN BY DENTURES

By W. F. Chappelle, D.D.S., Buffalo, N. Y.

THOSE PRECEDING ME HAVE GIVEN the prerequisites for the setting-up of the teeth by demonstrating the registration of the positional relations in the patient, and the re-establishment of positional relation in the articulator by adjusting the articulator to conform to the anatomical requirements of the patient and to the cusp-form and arch-type chosen.

Without going into detail of setting-up of the teeth, I shall introduce various dentures set up in articulation to accommodate diversified combinations of extreme anatomical possibilities.

We give great importance to correct articulation, because experience teaches that faulty articulation causes unbalanced plates, which in turn are the cause of discomfort to the wearer and of atrophy of tissues, impairing the function of the plates. Faulty articulation limits free natural mandibular movements or introduces new movements and eventually invites permanent changes of the condyle heads, occasionally of the condyle paths.

We have no right to cause avoidable discomfort or to invite tissue atrophy or other changes in the masticatory apparatus, indiscriminately and unnecessarily. We do not accept the necessity or advisability of changing by guess, established asymmetry at the condyle in the adult person.

Our practical experience has proven that an ideal articulation conforming to the anatomy of the patient is possible and in most cases preferred as practical.

The articulation of artificial full dentures almost invariably introduces a modification of the anatomical natural denture articulation. The effort to maintain stability of the plates is the main cause. Artificial denture articulation must function correctly as an integral part of the whole masticatory apparatus, permitting free and comfortable mandibular movements.

Ideal articulation means less shrinkage of tissues, less soreness by irritation, maintenance of stability, greater comfort, highest confidence, more perfect esthetic results, unrestrained natural masticatory movements and as a result, maximum masticatory efficiency. All this means much to a healthy patient, but infinitely more to the invalid.

In setting-up the teeth on the adjusted Hanau articulator, we may proceed in the customary way. The ready accessibility to the buccal and lingual surfaces of the teeth facilitates the procedure greatly in this articulator. After the teeth are set-up in wax, we check them in the patient's mouth and take a right and left lateral bite to readjust the articulator. After the readjustment of the instrument, we reestablish articulation in the articulator to conform to the correction, if necessary, and then proceed to vulcanize the plates.

The dentures which I have prepared will give a clear picture of the resultant dentures for the following combinations:

CASE	CONDYLE INCLINATION		OVERBITE	DENTURE
	RIGHT	LEFT		
1	45°	10°	deep	approx. horizontal
2	0°	0°	deep	approx. horizontal
3	50°	50°	end-to-end	approx. horizontal
4	50°	0°	deep	15 to 20 inclined transversely from right to left.
5	no record			

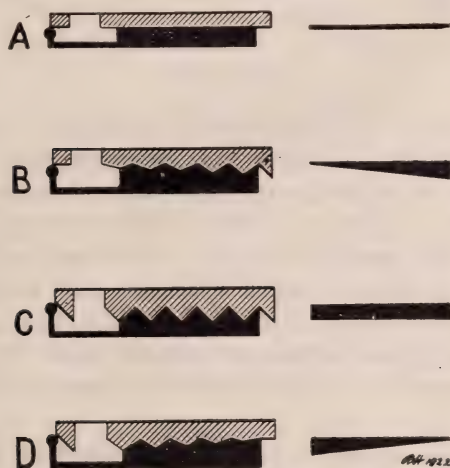


Fig. 12

- A—Flat condyle guidance. Flat incisal guidance. Disappearance of cusp heights.
 B—Flat condyle guidance. Steep incisal guidance. Increase of cusp heights to the anterior.
 C—Steep condyle guidance. Steep incisal guidance. Even distribution of cusp heights.
 D—Steep condyle guidance. Flat incisal guidance. Decrease of cusp heights to the anterior.

The sketches, (*Figs. 12 and 13*), given to us by Mr. Hanau, schematically illustrate the relation of cusp height, condyle inclination and incisal guidance for the various denture conditions with particular consideration of the curve of Spee. Attention is called to the

characteristics of the relative cusp heights in the sketches when associated with variously-inclined condyle surfaces, etc. These relations which were more or less known and described to us by early and recent writers, were studied and definitely co-ordinated by Mr. Hanau.

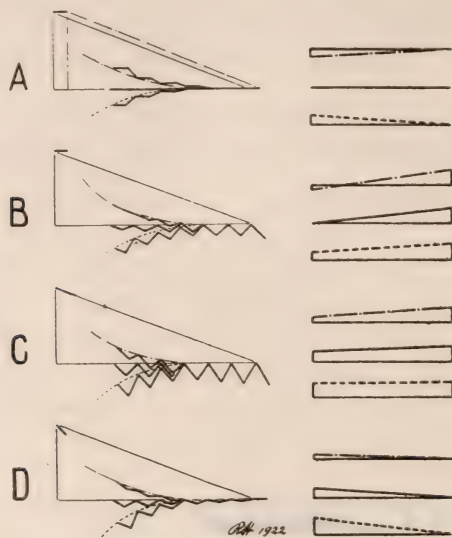


Fig. 13

I feel that this is an appropriate occasion to mention that I ascribe the conformity to articulation requirements of these dentures to the flexibility of adjustment and ease of manipulation of the Hanau articulator. Also to Hanau's interpretation of mandibular movements and his analysis of the reciprocal relation that exists between condyle guidance, incisal guidance and arch form.

In the above *Figures 12A, 12B, 12C and 12D*, the condyle guidance, the cusps and the incisal guidance are arranged on a straight line. This was done to arrive at characteristic figures, which are easy to memorize.

Figures 13A, 13B, 13C and 13D illustrate an extension of the investigation shown in *Figs. 12A, 12B, 12C and 12D*. The condyle guidance is placed posterior and above the denture as it is in nature.

Three different curves of Spee are considered in each case. Your attention is called to the fact that the cusp height has to decrease with an increase of the upward sweep of the curve of Spee. For the purpose of illustration an upwardly-inclined curve of Spee is considered together with a horizontal and a reversed curve. Condyle guidance, incisal guidance, cusp height and the curve of Spee are but a few of the factors which determine the arch form. Some of the characteristics are reproduced in these dentures.

CORRECTION OF SMALL ERRORS BY GRINDING

By H. T. Gallager, D.D.S., Buffalo, N. Y

MY PART OF THE CLINIC consists in giving you a technic for grinding-in and for the correction of errors by readjustments of the articulator mechanism.

We all realize that correct articulation is a delicate mechanical function. I will show how it can be accomplished with ease and accuracy with this articulator.

Let me say a few candid words about the accuracy of measurement we may expect in our work of denture construction. Direct measurement of living tissues and bone cannot be made in thousandths of an inch. We know that, and must consider it in our work. The reasons for our handicap are evident: *first*, the inaccessibility of some of the anatomical parts and, *second*, the resiliency and elasticity of the bone and tissue. Indirectly we may detect very minute errors by checking methods during the progress of our work. The corrections by re-adjustment of the articulator for the occlusal rims inserted and for the teeth in wax as has been demonstrated by Dr. McCarthy and Dr. Chappelle is a preliminary step of the entire technic. The chart, (*Fig. 14*), shows the limits of accuracy *within* which measurements are possible.

The given limits of accuracy of measurements within which our determinations are possible, do not, to any extent, weaken the hypothesis from which we started, namely, that the articulator must be adjusted to reproduce movements equivalent to those of the patient. The results we obtain by making measurements with the face-bow and the wax-bites and applying corrections, speak for themselves. Our experience with ill-fitting plates and poorly-articulating masticatory surfaces do not justify us in accepting the theory of the aimlessly-floating condyle. I just have to remind you of the maldistribution of masticatory forces, when we do *not* pay any attention to articulation in restoring tooth crowns or bridges on living teeth. These and other observations have stimulated our search for the causes of unsatisfactory artificial dentures. I probably speak in the sense of most of us, if I attribute our difficulties to the many efforts of the past to over-standardize the anatomical requirements of denture construction.

The readjustment of the articulator for correcting some errors found in the mouth of the patient, when the teeth are set up in wax, was shown by Dr. Chappelle. He and Dr. Snider also pointed out and explained by schematic figures, that the shape of the tooth cusps should conform to the anatomical requirements and the selection of incisal guidance. This should be taken care of before setting-up the teeth, so that the articulator will not be used as a

grinding-machine to grind off entire cusp formation of the whole denture or parts thereof. It is understood by all of us, that grinding off the masticatory surfaces should result in a slight closing of the bite only.

LIMITS OF ACCURACY OF MANDIBULAR MEASUREMENTS

MEASUREMENT	LIMITS
Position of condyle socket center	2 mm
Angular deviation of maxillary condyle line	3°
Angular deviation of occlusal plane	3°
Distance of incisal contact point from condyle line	2 mm
Horizontal inclination of condyle movement anterio-posteriorly	5°
Horizontal inclination of condyle movement laterally	10°
Inclination of lateral excursion of condyle head anteriorly	10°
Diameters of teeth	.05 mm
Contact of teeth	.10 mm
Angle of tooth cusps	15°
Angles of worn tooth cusps	5°
Tissue compression	.50 mm
Lateral excursion of condyle head	.50 mm
Horizontal relation of teeth in one jaw	.10 mm
Vertical relation of teeth in one jaw	.20 mm
Horizontal relation of teeth in both jaws	.30 mm
Vertical relation of teeth in both jaws	.10 mm
Inclination of tooth axis	arbitrary

Fig. 14

The figures indicate the limits *within* which we should be able to determine the anatomical measurements if they are necessary. Some of these measurements are determined indirectly. The figures themselves are based partly on observation, partly on computation and partly on estimate. The table is meant to be a basis for further investigation.

Minute interferences in articulation after vulcanization are usually due to the shrinkage of the vulcanite or displacement of the teeth. These minute interferences may readily be eliminated by grinding-in in the articulator and not in the patient's mouth. We check the articulation of the plates in the mouth of the patient and if necessary re-adjust the articulator. The slight interferences are readily detected by the use of articulating paper or impressions in wax. The impressions in wax serve the same purpose as the bites taken with the occlusal rims.

A great advantage of this articulator is the convenience with which it may be set to favor any particular part of the denture fo-

grinding-in, in case an error is found. The following regions, if found to show interference, may be favored in grinding-in the masticatory surfaces:

1. The entire anterior part of the denture is corrected by increasing the condyle inclination. This is done by swinging the levers A_1 and A_2 (*Fig. 1*) backward, say 5° at a time. The denture is then ground until we again obtain perfect articulation throughout the masticatory surfaces.

2. The entire posterior part of the denture. Decrease the condyle inclination by setting the levers A_1 and A_2 (*Fig. 1*) forward equally on both sides, say 5° at a time.

3. The *left* incisal region is favored by increasing the inclination of the *right* condyle movement *more* than on the left, let us say 10° on the right and 5° on the left.

4. The right incisal region: We increase the left more than on the right.

5. The left posterior region: Decrease the inclination of the condyle movement on the left more than on the right.

6. The right posterior region: Decrease on the right more than on the left.

7. To increase the relative lateral movements posteriorly: move the center socket E (*Fig. 1*) back.

8. To decrease the relative movements posteriorly: Move the center socket E (*Fig. 1*) forward.

These adjustments though difficult to describe, are simple in themselves, and are readily acquired in practice. After readjustments in the articulator start grinding off in lateral and protrusive positions. The grinding should be continued until we again arrive at central occlusion. It is not advisable to try to correct errors by machine grinding; when too great an amount of cusp material must be sacrificed the teeth should be readjusted.

How efficient this correction technic is, I am in position to confirm by two cases in my own practice. These cases were set-up and ground-in on arbitrary articulators. The articulation in the arbitrary articulators was perfect. I made a number of unsuccessful efforts to produce, with the aid of said articulators, satisfactory articulation in the mouth of the patient. These cases were afterwards remounted with the face-bow in the Hanau articulator and the condyle movements adjusted with the aid of wax-bites. The regrounding, by the method described, took five minutes in the Hanau articulator. I experienced one of the greatest and most pleasant surprises by noting the great improvement of the articulation in the mouth. The patients must have appreciated the improvements too, for I have not seen them since.

It seems to me that we have made a great step forward in taking

the guess out of denture construction, and that we have placed it on a scientific and practical basis.

The labor of procuring correct articulation has thus been reduced to establishing and utilizing:

1. Face-bow registration.
2. Central occlusion.
3. Right and left lateral bite.
4. Adjustment of articulator.
5. Setting-up of teeth.

Previous investigators have elaborated on every one of these five points but none of them have ever co-ordinated a technic and an articulator which in the application is as simple, logical and accurate as we have the pleasure to present.

Dr. Klipfel will now present a method of keeping records, a most important part in the modern prosthetist's work.

RECORDING ANATOMICAL MEASUREMENTS AND TECHNICAL SELECTIONS

By C. M. Klipfel, D.D.S., Buffalo, N. Y.

THE TECHNIC DEMONSTRATED is one based on relative measurements throughout. All records, therefore, must be considered from that point of view.

Previous investigators frequently referred the various parts of the denture to the condyle line and an imaginary occlusal plane as geometrical basis. Hanau disposes of the occlusal plane as a reference entirely, accepting the occlusal plane, or rather the masticatory surfaces, as a compromise resultant of the prosthetist's selection of tooth-form and position, of his conception of articulation, of the articulator adjustments conforming to definite requirements and lastly of the space in the mouth of the patient. The latter is given by the accepted separation of the jaws and, of course, by the formation of palate and ridges. All conditions have reciprocal effect upon each other.

It would be quite laborious if we had to determine and express the rather complex spacial relations of the masticatory apparatus in terms of a surveyor by absolute measurements. The acceptance of a relative method eliminates such handicap.

The rotational relation of central occlusal space in the mouth of the patient to the anatomical condyle line was re-established in the articulator with the face-bow. We adjusted the articulator to accommodate also the extreme right and left lateral occlusions of the jaws to accommodate the space within which change of position or movement is required. The lateral bite method was demonstrated by Dr. Reynolds.

Such procedure was equivalent to: *firstly*, locating the maxil-

lary condyle line in relation to the denture space, and, *secondly*, determining the inclinations of the condyle surfaces in relation to the denture space. For all these determinations, we used the occlusal rims, which are but a set of preliminarily accepted dental plates, filling the space available in the mouth of the patient. Thus, with the aid of the face-bow, the occlusal rims and the three wax-bites, due consideration was given to all anatomical requirements. These three phases of the technic as well as the selection and adjustment of the incisal guide, which latter accommodates the technical requirements, were given in this clinic. It was our endeavor to demonstrate the necessity to proceed systematically from step to step, for we realize the effect of a weak link in a chain.

An important part of all methodical work is a record. In a technic of this kind the record appertains to spacial formation and relation as well as to the articulator adjustments, which were made to accommodate the peculiarities of each individual case.

The records are indispensable in the busy office or laboratory, where we have to change from one case to another. The records therefore should be preserved for the duration of the case.

Due to the rotational relation of the dentures to the condyle line, we must provide an impression of the masticatory surfaces as they were mounted in the articulator before vulcanizing, so that we may readily remount the plates for the final grinding-in. So far, the interchangeable cast-plates, to which the cast models were attached by plaster of Paris, served for that purpose. Without a fixation of this spacial relation of the denture in the articulator, the record of the condyle movement adjustments, etc., become obsolete because they are to be understood relatively only. The records of the condyle movements are preferably made on the standard-size record card and filed as usual.

Patient: Mary Jones

Articulator No. F76

Face-bow record No. 19

Horizontal inclination of condyle

left 30°

Horizontal inclination of condyle

right 15°

Socket wall plate

left in

Socket wall plate

right in

Center socket position

3

Distance between jaw members

90 mm

Incisal Guide

150°

Remarks:

Fig. 15

The positions of the condyle levers and the center socket are read on the calibrations, that of the condyle plate is taken from the position of the high edge of the inclined surface. The incisal guide-setting is noted by measuring the distance of its upper edge from the frame or by the distance between the inner surfaces of the

articulator jaw members, preferably at the forward end of the cast-plates. This measurement completes the record for the card.

The denture position in the articulator is registered on the plaster cast on which is the impression of the upper masticatory surfaces on a layer of compound supported by a bulk of plaster of Paris attached to a lower cast-plate. The impression is that of the upper teeth while in wax, or when the teeth are vulcanized.

The cast-plate I am using is especially made for that purpose. Note the smooth flat surface with the tapering projections. We may easily wedge off the plaster of Paris from this plate and reset it into exactly the same position.

Sometimes I dispose of the recording card and mark all records on the plaster. Thus:

Jaw separation and incisal guide record, in front. Horizontal inclination of the condyle movements and condyle socket wall plate position, on the sides to which they belong and the back center-socket position on the back of the plaster of Paris body. There may also be added notations of: Tooth type, make and so on. This completes the record, which is identified by the patient's name.

THE NATIONAL CHILD HEALTH DEMONSTRATION BEING
CONDUCTED AT MANSFIELD, OHIO

BY JOHN H. BRISTOR, D.D.S., MANSFIELD, OHIO.

MEMBER OF RICHLAND COUNTY ADVISORY COMMITTEE OF CHILD HEALTH DEMONSTRATION AND
MEMBER OF EXECUTIVE COMMITTEE

(Written for THE DENTAL SUMMARY.)

SOMEONE HAS SAID, "Health is the handle by which we can apprehend and perceive pleasures; and that sauce which alone makes life delicious." With this in mind and to endeavor to make the future generation, and in fact the present generation, a healthier people and thereby be the better enabled to enjoy the pleasures and benefits of life, six national organizations—American Child Hygiene Association, American Red Cross, Child Health Organization, National Child Labor Committee, National Organization for Public Health Nursing, and National Tuberculosis Association—with headquarters in Washington, D. C., decided a year or more ago to pool their interests in a health demonstration covering a period of years; thus was formed an organization now known as The National Child Health Council.

The Council then set the period for the demonstration as five years, appropriated \$200,000 for carrying on the work, and gave the work the title of "The National Child Health Demonstration." The \$200,000 appropriated by the Council is to be supplemented by funds from the community in which the demonstration is conducted. The Council decided the demonstration should be conducted in a city and county that should be fairly typical of the average American life, the city to have a population of between 20,000 and 30,000, and the county of between 50,000 and 60,000. A normal percentage of the population should be engaged in manufacturing; there should not be any strikingly predominant racial stocks; there should be a variety of industries; the surrounding area should be an agricultural territory; the community should be located in the birth registration area and vital statistics should be fairly complete; the mortality of infants and children should not be strikingly abnormal. These requirements fixed, invitations were asked for and eighty communities throughout the United States applied. But one could win, and that was Mansfield, Richland County, Ohio.

The town selected for the demonstration, the National Child Health Council selected Dr. Walter H. Brown, of Bridgeport, Conn., as the director of the demonstration. Dr. Brown is an expert in this line. He was the Health Officer that put Bridgeport in the front in health matters; he is a personal friend of and was a co-worker in Bridgeport with Dr. Alfred C. Fones, of the dental clinic fame. Dr. Brown came to Mansfield direct from Paris, France, where he was the director for the International Tuber-

culous Council. Dr. Brown was given no strings in selecting his assistants but was to pick the best that could be found. After a careful investigation he selected as his assistants, Miss Helen Boyd as director of nursing. Miss Boyd is a graduate of Radcliffe and Vassar. She received her training in nursing at the Johns Hopkins Hospital, Baltimore; coming to Mansfield from Bridgeport, Conn., where she was superintendent of the Visiting Nurses' Association, which she reorganized and placed it among the foremost associations in the country.

Miss Ethel Beard is the director of health educational activities. She is a graduate of Oberlin (Ohio) College and the University of California. She is experienced, both as a director of recreation and playground and director and teacher of physical education; she is also a graduate nurse. She came to Mansfield from the position of state supervisor of school nursing of the department of public instruction of Pennsylvania.

Miss Emma Duke is the director of research and reports. She will be one of the important persons of the demonstration, as a careful study of what has been the state of health of the children of the United States in the past and to make close observations of the effects of the newer methods for health promotion upon the children of Mansfield and Richland County in particular. Miss Duke received her preliminary education in the George Washington University and was formerly director of industrial studies and later special agent of the National Child Labor Committee, and came to Mansfield from the position of director of Statistical Service of the American Red Cross, Washington, D. C. Miss Duke became nationally known for her studies of infant mortality, which she conducted for the children's bureau.

The Mansfield organization of the work will be conducted through an organization known as the "Richland County Advisory Council of the National Child Health Demonstration" and is composed of one representative from each of thirty-two organizations in Richland County, and five members from the community at large; some of the organizations represented are: The Richland County Medical Society, Richland-Ashland Counties Dental Society, Red Cross, Humane Society, Public and Parochial Schools, Mansfield City Administration, Mansfield City Health Department, Mansfield and Shelby General Hospitals, Rotary, Kiwanis and Exchange Clubs. In this Advisory Council is an Executive Committee of eight members.

Although co-ordination in the National Child Health field is almost a pioneer effort the Council has made remarkable progress in its four months of existence. The member organizations clear their literature, plans, progress, and itineraries through the Council. Methods of co-ordinating their work with other national organizations, public departments and state and local agencies are being developed through reports, conferences and field experimentation. National advisory committees, dealing with such subjects as foods and nutrition, health education of school children, current child health news and literature, health provisions for state laws relating to

children, and so on, are being organized. The committees consist of representatives of national bodies having expert knowledge and experience to contribute, and of individuals with outstanding ability. Their chief function will be to collect, study and make available to the entire country the best information and most authoritative opinion on subjects that contribute to healthful childhood. These advisory committees will have much to contribute to the demonstration, particularly those on foods and nutrition and health of school children.

The preliminary and detailed studies of the community needs and social resources are being made.

Miss Ethel Beard has been officially appointed to the teaching staffs of both the Mansfield city schools and the Richland county rural schools, under the title of "Supervisor of Health Education," working under the direction of the superintendent of the city schools and the superintendent of the rural schools and assisting the teachers in teaching good health. The demonstration is assisting the Mansfield Visiting Nurses' Association in caring for the needs of the worthy poor and spreading good health propaganda.

The physicians and dentists of Mansfield city, and county officials, women's organizations, churches, civic and social organizations, business and labor, are enthusiastic in making this demonstration a success and making good the slogan propounded by the director of the demonstration, Dr. Walter H. Brown, "Make Good Health Contagious."

Reports of this demonstration will be given in THE DENTAL SUMMARY from time to time as the work progresses.

THE PSYCHOLOGICAL LAW OF ANESTHESIA

BY BERNARD FELDMAN, D.D.S., PATERSON, N. J.

(Written for THE DENTAL SUMMARY)

(While not necessarily endorsing any of the deductions of the author of this series, the Editor and publishers believe that, in the interest of the advancement of science, the work of all sincere investigators is deserving of consideration by the largest possible group of intelligent men and women. It is in this spirit that space is devoted to these articles by Dr. Feldman, even though they may be considered by some as rather remotely related to dentistry.—G. E. H.)

(Concluded from page 437 MAY DENTAL SUMMARY)

CHEMICALLY INDUCED SLEEP

Gwatmey mentions about five hundred drugs which are more or less capable of producing the subconscious condition in which one or more of the five objective senses are held in abeyance while the subconscious mind assumes control; these range from the mild exhilaration of the alcoholic and the deeper narcosis of cocain and opium victims, to the most important drugs which produce complete surgical unconsciousness. These are chloroform, ether and nitrous oxid. It must not be forgotten that each drug produces certain characteristic reactions to be manufactured by the ego; the *vital principle* which has already been discussed in Sections 5 and 25 is identical in all. These chemical effects are secondary in importance to the morphological change which takes place in the nerve-cells by the retraction of the dendrites under the stimulus of electrical, thermal, mechanical, chemical and psychical agencies which emanate from the *Infinite Mind*.

We must admit that, while the drugs do not act of themselves, chemical changes do surely take place in addition to this morphological and psychical change, *when drugs are employed* to produce surgical unconsciousness. (Crile, Lillie and others.)

These chemicals act as violent irritants, and tend to disturb the normal equilibrium of the cells. Nature resents any such outside interference to the normality of its tissues, and tolerates it up to a certain degree only. *If this irritation is continued to excess, beyond the limit of the cells' endurance, shock results.* This same result is obtained even when such a comparatively harmless thing like reducing of the cells' temperature is carried to an extreme. Cold applications, such as produced by the ether or ethyl-chlorid spray, will produce a short superficial anesthesia when applied to the skin; if applied too long, it will cause cell destruction and sloughing. Similarly, we are warned not to disturb unduly the normal conditions existing in the tissues when giving a hypodermic injection of an anesthetic solution; we use a sterile physiological salt solution at body temperature.

DANGERS OF NARCOTICS

To induce general anesthesia by the use of powerful drugs is, therefore, a dangerous procedure fraught with uncertain possibilities. The danger

lies in the relative irritating power of such drugs in disturbing the cells beyond the limit of their endurance. For this reason, nitrous oxid is safer than ether or chloroform, because the gas exerts a measurably protective action on the brain cells, the suprarenals and liver; instead of harming them, it causes changes which closely resemble the histological *reparative* changes which take place in these organs during normal sleep. (Crile.) And even this safest drug can be pushed to such lengths as to cause death upon rare occasions.

Ether and chloroform cause cell necrosis and therefore produce shock or increase it when already present.¹⁵ Chloroform affects the heart more severely, while ether and nitrous oxid affect the respiratory tract and have a tendency to asphyxiate. Ether and nitrous oxid have a decided action on the blood stream and cause its reserve alkalinity to change to acidity. In this connection Crile says:⁶

"Surgical anesthesia by ether and nitrous oxid is an induced acidity. If the acidity is slight, the anesthesia is light and the patient responds to even slight stimulation. As the acidity increases, the anesthesia deepens; first, associative memory is lost, but the cutting of the skin causes involuntary movements still; then muscular tone is lost and even the strong contact stimuli of a surgical operation cannot drive their impulses through the brain to the muscles; and finally, the decreasing alkalinity may so nearly approach the neutral point that even the circulatory and respiratory centers fail to respond; respiration and circulation are suspended and acid death—anesthetic death—follows.

"A patient, whose reserve alkalinity has been seriously reduced by exertion, emotion, physical injury or infection, or by reason of starvation, interference with respiration or impairment of the liver or kidneys, is approaching acidosis, does not take an inhalation anesthetic well; there is much nausea and slow recovery from anesthesia in some cases and death in others. Children in particular, who are near acidosis, always pass into that state and die unexpectedly.

"The facts show how necessary it is for the surgeon and the anesthetist alike to realize that during an operation each is draining the store of reserve alkalinity. If the surgeon employs a local anesthetic, uses gentle manipulation and produces the least possible trauma, he conserves his patient and demands less of the damaging inhalation anesthetic. The anesthetist in turn conserves the patient by using the lightest possible even anesthesia *administered with the least psychic trauma*.

"These studies show that for the bad-risk patient, nitrous-oxid anesthesia is to be preferred to ether, and that analgesia with local anesthesia should be employed, with general anesthesia only when it is demanded by certain phases of the subject."

SUMMING UP

As a lawyer would say, we now rest our case with the jury of readers. We have presented all the available data (none of it our own but that which the various sciences have furnished us). The only new thing we did was to combine them into one rational whole which reveals the true and correct mechanism of consciousness. If our exposition is the true one, as we firmly believe it is, it should be universally known by every anesthetist, for it is self-evident that the correct theory of anesthesia is of fundamental importance.

Because the data furnished us by the orthodox sciences of physiology, anatomy, histology, etc., do not cover the entire subject of anesthesia, we were forced to turn to the less-accepted sciences of psychology and occultism for such additional psychical data which are absolutely necessary for a complete exposition. Such super-physical data embraced more fully the phenomena of consciousness, of vitality, of the Ego, of sleep, etc., etc. We find that these facts, instead of clashing, substantiate the physical sciences fully. We confidently present our "law of anesthesia" to the professions with the sole purpose of helping and advancing the true rationale of anesthesia.

It is necessary to know that man is more than just flesh and bones, and that he is a septenary of principles ranging from Meta-spirit down to the gross matter that comprise these bones and flesh. We have tried to present the facts in a manner that would not be confusing to the average reader, but we realize that we are not capable to do such a presentation full justice. Mr. George E. Harter has been teaching the Great Philosophy for thirty years and more, and he is infinitely more capable of giving us the real facts. All that we have attempted to show is that man's seventh principle is Spirit, and that this Self is the real man who employs certain vehicles of consciousness which are of extreme importance to our problem of anesthesia. Side by side with it, we traced the Vital Principle from its divine source, through these several vehicles because it is the underlying Principle or Force which the Self employs to carry out the vital processes of the body.

If we can rid our minds of all illusions, or Maya, we can see that this SELF is man's only distinctive entity; it cannot, therefore, be synonymous with the Ego which is one of its fractioned aspects. When the sixth principle acts as ITS vehicle, we have the Spiritual Ego; when the fifth and sixth principles are ITS vehicles, we have the Human Ego, and thus each aspect of principle of man is a vehicle of consciousness of this Spirit. The Higher Self (called Atma in Sanskrit) is indistinguishable from the All-Spirit, for it is really one and the same essence. It is too divinely ethereal and abstract, and of course it is non-materializable and can never be objective under any circumstances, even to the highest spiritual perception. The Lower Self is the physical man made conscious through the four lower vehicles which the SELF uses. It is of utmost importance to the anesthetist to understand the correct relationship which exists between ¹the

spiritual self or Inner man, "the physical body, "the vital principle and "the outside stimuli. (See Foot-Notes below.)

That we cannot see this Spiritual Self will not deter the earnest Seeker after Truth in these days of the wireless telegraph, for super-physical phenomena are coming into their own. Millions of amateurs are today beholding one of the wonders contained in the ether of space, and they are madly placing receivers on the ear to "listen in" on splendid wireless concerts and programs. The wireless telephone has become perfected to the extent that some one has already conversed from London, and the message was received in New York City, FIFTY-TWO SECONDS LATER. From Chicago comes the report recently, that the transmutation of metals has been finally accomplished, in which tungsten has been definitely and permanently changed into another element, helium, through treatment in temperatures between 50,000 and 60,000 degrees. This shows that the nature of elements can be changed, and it blasts the theory that the atoms of elements, supposed to be absolutely indestructible, cannot be broken up by men. Who knows what greater wonders are in store for us and what super-physical discoveries will be extracted from the SEPTENARY ether of space!

"If thou wilt know the invisible, open thine eye wide on the visible," says a Talmudic maxim. "As above, so below," says an occult maxim of Hermes. For the visible and invisible worlds are inter-related and interwoven, and the laws of vibration are the same in the higher worlds as in the physical. And those men can serve the visible world and its suffering humanity best who KNOW most concerning the energies which pervade the SEVEN zones which comprise SPACE.

PRACTICAL APPLICATION OF PRINCIPLES

Knowing the physical and super-physical forces that enter into the causation of anesthesia in the human organism, we can make practical application of this knowledge *to assure us of a safer and a better result.*

All roads lead to the same objective, which is, in this case, the ideal anesthesia. Happily, we can call upon any one or more of these agencies already enumerated, to assist in bringing about this ideal result.

We must not forget that each agency is a foreign reactive irritant,

"Suppose you desire to lift a weight; what is it that performs the labor?"

"I answer, it is your spirit! It is that spiritual principle within you that *thinks, feels, loves and reasons* — — — It is YOUR INTERIOR SELF! And if the reader will reflect upon and discover how it is that his spirit can raise a given weight, he will receive a reasonable and philosophical answer to the question under consideration. First, your spirit, which is a fine organization of fine materials desires to raise the weight referred to. Now I will describe to you the various invisible agencies or instrumentalities which are engaged within your organism to accomplish this purpose: The *first* agent is your spirit; the *second*, your vital magnetism; the *third*, your vital electricity; the *fourth*, your nerves; the *fifth*, your muscles and the *sixth* is the bone, which by acting in concert with the above named agents, succeeds in raising the weight.

"Many unscientific persons suppose that MUSCLE does all the labor they perform; while in truth, muscle is only *one of the agents* which the indwelling spirit employs to do its will."

(Andrew Jackson Davis.—"The Philosophy of Spiritual Intercourse").

which causes the body to exert certain vital responses to overcome the irritation and the cells of the tissues must therefore be irritated to the minimum. When we employ chemical means to induce anesthesia, we can reduce the trauma by employing some of the other agencies preparatory to the administration. Suggestion is one of the most powerful agents that can be employed in the waking state. Mesmerism has its place to reduce this trauma to a minimum, and it should be utilized when indicated. Dr. Crile has applied the principle of nerve "block" or "blocked shock," which means that by pressing on the nerves running from the injured part to the brain, we inhibit the transmission to the brain area of the knowledge of injury. Besides this physical agency of pressure, he obtains a similar result by injecting the subjective-producing drug, procain, or other anesthetic solution, around the course of the nerve trunk leading from the place to be operated upon to the brain. He found upon experiments on animals that when the administration of morphin preceded the induction, then a smaller amount of the anesthetic was required to produce complete anesthesia, without interfering with the returning of the blood to its normal alkalinity.³⁹

Given an operative case, the surgeon can see how far he can push any one of the agencies at his command to obtain a satisfactory anesthesia, and he can call upon and employ one or more of them in order to assure success with a minimum of psychic and traumatic shock to his patient. For instance, where we have a bad accident case, in which there has been much laceration of tissues and loss of blood, or in other "bad risks," the agency indicated is *psychic*. There may be other conditions in which the *psychic* is contra-indicated.

Knowing that we have in consciousness a spiritual function which needs spiritual nursing and upbuilding, we will not neglect to "feed" the sick, frightened, and discouraged patient with spiritual food in the form of good cheer, optimism, hope, and happiness. These are intense spiritual forces, electro-spiritual, yet compact with such powerful luminiferous ether as to act upon internal conditions with the force of magic. The influence of the mind upon the body is so powerful that it has effected so-called miracles in all ages. Joyfulness is of the highest vibratory energy which can be freely drawn from the eternal divine forces in the ocean of ether which pervades all space. The opposite qualities such as *grief* and *fear*, on the other hand, have such power over the subtle fluids of the body as not only to derange the internal organs, but even to turn the hair white.

Having discussed the close analogy which surgical anesthesia bears to sleep, it may be suggested that the same care be taken to assure restful and beneficial slumber prior to anesthetization, as is taken by the person who goes to sleep naturally every evening. Sleeping should be regarded as a sacrament; to this end, the preparation of body, soul and spirit is all-essential. The operating rooms should be well ventilated, they should have beauty or soul-satisfying atmosphere, and should be entered with an exaltation of spirit, in which love and faith are predominant and such adverse sentiments as fear or disturbing memories are banished. The sheltering

from light and unwelcome noises, by dropping of curtains and the shutting of doors, will exclude all disturbing impressions from the external world. All appetites, lustful propensities and passions, which disturb the physical body through the stomach or the psychical part of the body through a remorseful conscience, will tend to disturb the quality of our sleep, be it natural or artificially induced. By avoiding certain drugs, alcoholics and fermented liquors, we avoid just so many more unrelenting enemies of our sleep. Even the posture should be such as to assure maximum comfort and serenity of mind with a minimum amount of effort. The importance of this association to the problem of anesthesia was presented to dental literature by Reithmuller, and the potency of suggestion, even in the waking state, was emphasized in nitrous-oxid and oxygen anesthesia by Smith and Teter.

SURGICAL AND PSYCHICAL SHOCK

Will anyone who has followed this discourse thus far, hereafter attempt to give an anesthetic to a terrified, excitable patient? By careful means only will such an attempt be made, by anyone knowing the psychic nature of the individual. Such a patient, no matter how deeply unconsciousness, does not exhibit a complete relaxation and absolute insensibility. The use of much more of the drug is also necessary, furnishing an extra danger to the patient, as Dr. Crile has shown as quoted above.

Goltz, S. Weir Mitchell, Keene, Crile and Meltzer believe that shock is a nerve-reflex.¹⁶ During our discussion, we have shown that shock follows when the vital resistance of the cells, mainly nerve-cells, cannot longer cope with the irritating foreign stimulant. Or, as we have declared, shock is a psychical condition, in which the Ego is slowly losing its hold upon the physical body; the ethereal body is slowly leaving it, and immediate measures must be taken by the attending physician to release the irritant and to increase the vital resistance of the patient.

Dr. F. B. Turck's article on traumatic shock, also Dr. Mann's,^{16 17} will be found interesting in this connection. Where shock is already present, it seems foolhardy to use any agent that may add to it; the better and safer way is to keep traumatic and psychic shock to a minimum. This can be accomplished through two channels, *i. e.*, through physical and psychical means. Dr. Turck and Dr. Crile accomplish it by physical means, as already quoted. Dr. Bernheim employed the psychic channel by employing hypnotism to aid him to induce surgical anesthesia by chloroform.

He says in this connection:¹⁷

"Some people can be hypnotized with chloroform before they are really under its influence. In some cases, the hypnotic trance comes before the anesthesia. If it is deep enough to cause complete anesthesia, as I have seen it, the operation may be performed without delay; if not, I keep on giving the chloroform until the anesthesia is complete, which takes place more rapidly because aided by suggestion. By acting in this manner, I also prevent the period of excitement in these cases."

THE FUNDAMENTAL BASIS

In conclusion, we can describe anesthesia as one of the vital processes of life which are subject to reversible arrest; it comes under the instinct of self-preservation. The drugs employed surgically to induce the condition are simply physical agents, just as psychical stimuli are simply psychical agents, which cause the normal electrical equilibrium of the tissues to be disturbed, producing the subconscious phase of mind. This brings the ever-vigilant monitor, the Higher Ego, into play, and it is compelled to overcome the irritating stimulus. This it does by drawing upon the reserve electro-nervous energy which is stored up in the voluntary and involuntary nerves of the body. The Higher Ego transmutes this potential energy into kinetic energy by bringing into play its mechanism of consciousness and the defensive arrangement. From the true "seat of consciousness" which resides in the Ego, this kinetic energy is sent to the medulla oblongata which contains the centres of all vital functioning. The dual nervous system receives the stimulus and the end terminals, or the dendrites of the nerve-cells, are caused to retract in order to completely isolate the cells, rendering it impossible to transmit further sensations of pain or feeling. The more complete the cell isolation, the more profound is the anesthesia produced.

The reader, who has noted that there must be some relation between the anesthesia accompanying sleep, hypnosis or similar conditions and that produced by chemical substances or narcotics introduced into the organism from the outside, can judge for himself whether or not there is a fundamental basis that is applicable to all. On this basis rests or falls the theory which has been advanced under the name of the "Psychological Law of Anesthesia." Its truth can only be proved by applying it universally; if it fails in one instance, the law is faulty and will be superseded by another which permits of NO exceptions. The laws of Nature are immutable and permit of no exceptions. In applying the law, many problems which have defied explanations, may lend themselves to a readier solution. For instance, we can now see how Dr. Crile's preparatory administration of morphin will produce a similar result as Dr. Bernheim's psychic treatment; both men obtain the subconscious state of mind with a minimum surgical and psychical shock. The power of mental suggestion is another instance; it can even be employed by the physician or dentist in the patient's waking state. And so many other problems may be solved by applying the principles embodied in this discourse.

To render anesthesia safer and better is surely a desirable aim; one can gain this only by a better knowledge of the physical and *super-physical* facts, which will make for a broader viewpoint and a deeper understanding of the problems involved.

This does not mean that we are to abandon the present methods of anesthetization. They have become too well standardized and can continue to serve well. They *will* serve better and safer by an application of these principles that touch man's psychic or spiritual being. We do not know all

that there is to the subject; as it touches upon one of the vital processes of life (the instinct of self-preservation), it may defy solution for a long time. From what we *do* know, the spiritual attributes of man not excepted, we have tried to collate these facts into a regular and orderly sequence that will embrace *all* the factors that are relative to anesthesia and to place them upon a more solid scientific basis. Let us hope it will hasten the day when anesthesia shall take its dignified place among the grand sciences.

CONCLUSION

We will not be surprised if the truths embodied in this discourse may not be accepted by medical science at the present time. We are even prepared to receive the sneers and the ridicule which usually reward a truthful exposition. It is so easy for men to deny spirit when "having eyes they see not" that everything material **MUST** be spiritual. We must rely on the future to justify our stand because we know that the next step in man's evolution will unfold the inner spiritual powers latent in man by means of which he will discern these truths. We are on the ascending arc in our spiritual progress. Already there are numberless men who are following in the footsteps of the Masters of old. Bravely and unflinchingly, they are climbing the Path and approaching a little nearer each day to their Deity, which is the divine God—essence in themselves—**THE FATHER IN SECRET**. Such Treaders of the Path are purifying the physical vehicle, and training to use their inner spiritual senses to revel in the glorious sounds, colors, and spiritual forces of the astral realms. Just as the X-ray is rendering matter permeable, so is the clairvoyant sense making it possible for man to use his "spiritual eye." What a great aid such a clairvoyant faculty will be to the anesthetist of the future! How much safer will the patient be in such an anesthetist's hands! Such a doctor's diagnosis and sight will not be shut out by the density of the physical body, but he will be enabled to act with perfect definiteness, and to trace the action of his drugs with the precision which comes from clear vision. Such Treaders of the Path know that what we have written is the Truth; others are not expected to believe as readily and they will have to wait until their sixth sense, intuition, becomes stronger developed. Their time will come some day, if not on this Earth, then on some other. For the inexorable Law of Evolution decrees that every man must take this next step in evolving his astral body with its astral senses. It may take millions of years for Man to function perfectly in his astral body, and it may take billions more to evolve his spiritual body. The mills of the Gods grind slowly but surely. The soul of man must end his pilgrimage spiritually perfect so that **IT** may return to the feet of the **INFINITE SPIRIT**, as spiritually perfect as **MAN** was aeons ago when he was a Son of God who had fallen from grace and been sent upon his long pilgrimage.

As F. S. West truly says:

"Man is a microcosm—a miniature universe possessing infinite possibilities. He acquires knowledge, reason, and intelligence, as he slowly

climbs the mountain of experience, and ETERNITY IS PROVIDED IN WHICH HE MAY FIND THE TRUTH."

We wish to convey our thanks for the reprints sent by Drs. Crile and McLendon; also for the personal assistance which we have received by letter from Prof. Lillie, of Woodshole, Mass., and Prof. McMechan, of Avon Lake, Ohio. We wish to thank Mr. S. C. Cooper, of the Western Union, and my good friend, Dr. R. R. Schleusner, of Paterson, N. J., for many friendly hints. Last, but not least, we extend our thanks to Mr. George E. Harter, who unhesitatingly and gladly offered us his wide knowledge on occult matters, and without whose assistance, our presentation would be much inferior and less truthful. As we began by dedicating the article to Truth, so do we end it with an earnest appeal for the Truth, in the interest of science.

Some day the world, and particularly the dental and medical professions, is going to thank Dr. Bernard Feldman for what he has done in his great work here brought to a close. His task has been tremendous, and he has done it well. Every student of Real Things should read and study this series of articles. They do much to place his knowledge in proper and logical sequence.—G. E. H.

CORRECTION

Foot-Note No. 5 belongs on page 254, and Foot-Note No. 6 belong on page 251.

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Would you *Excel*?

Push on where others falter,
Cold *Reason* for your guide,
Success your altar.

Would you be *Loved*?

Forget self and ambition
And strive to better make
Your fellowman's condition!

—G. H. C.—*In Clinical Medicine*

PENETOLOGY

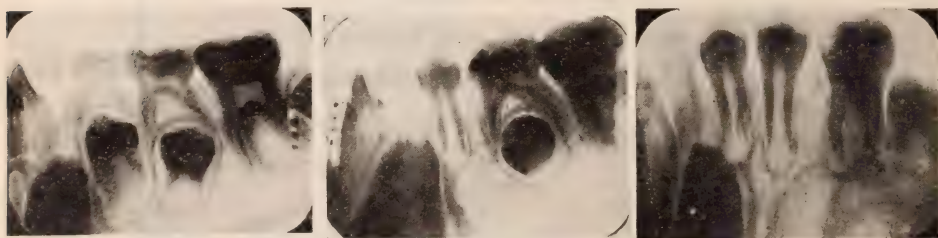
Conducted by WILLIAM A. LURIE, M. D.
1130 MAISON BLANCHE BUILDING
NEW ORLEANS, LA.

This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

IN MAKING AN INTERPRETATION from a dental penetogram it is necessary to understand what pathological process or processes may be found in the various grades of tissue and how pathology alters such tissue, so that a change in the appearance of a given area can be understood as a greater or a lesser degree of penetration than should exist. A substitution of the shadow of the proper grade for some shadow of a different grade should be interpreted. The knowledge therefore of what grade of shadow exists normally in tissue and at what age and under what conditions such shadow should be replaced by a different grade is an important factor. The fact that at some stages of development certain shadows show pathology while at other times they do not, is apparent.

Fig. 1



A

B

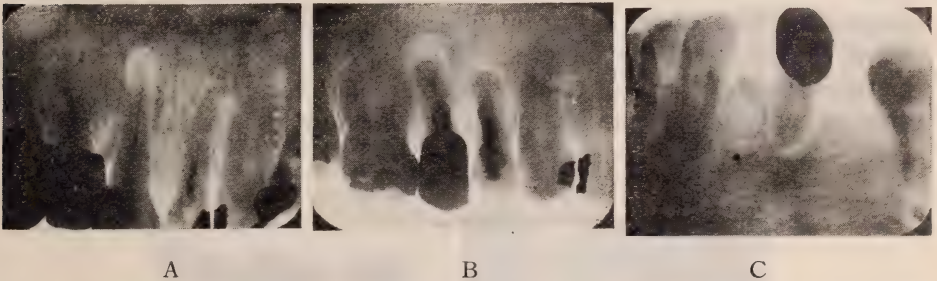
C

Let us refer to the accompanying illustrations (Fig. 1), and let us compare them, particularly in the apical appearance as expressed in Grade 1 type of shadow. These illustrations represent the teeth of an incompletely developed arch. In A there can be seen the early formation of the tooth germ, with the formation of the crown of the tooth and the beginning of the root. Tooth buds or germs are represented by an area of soft tissue entirely encircled by a limiting area of greater resistance than Grade 1 shadow, and presenting themselves variously in the alveolar process. In instances such as

those in which the permanent teeth replace deciduous ones, they are found under the deciduous teeth they replace.

The point now is that about such deciduous teeth there is the area of Grade 1 shadow, surrounded by a limiting area, which in appearance is much like a circumscribed area of infection. That this may be still more confusing in cases of newly erupted teeth is pictured in B and C. Particularly in C where the deciduous teeth have disappeared and the newly erupted teeth are in position and the apical ends are wide open, we sometimes find a confusing condition. This must often be differentiated from some infectious processes.

Fig. 2



In *Fig. 2*, periapical shadows of Grade 1 type can be noted about different teeth. These are variously illustrated. These are examples of the destructive type of shadow substitution. Here it will be noted that there is a rather definite line of demarcation indicating the extent of the substitution and extent of destruction of alveolar process of Grade 2 A shadow. Except in the instance of the root of the first premolar and the crowned second premolar in C of *Fig. 2*, root-canal fillings can be seen in all of these teeth. The great and outstanding difference however in the appearance of Grade 1 shadow in deciduous and incompletely-formed teeth and that the result of destruction by infection or any cause, is the fact that in the former instances, the presence of a wide apical opening and a large root canal can be made out, while in the latter cases the tooth apex will be found to have become fully formed, the apical opening small and the canal smaller. There is an exception to this, and that is in the instance in which an infection or some other factor causing the death of the pulp has taken place before the complete formation of the tooth.

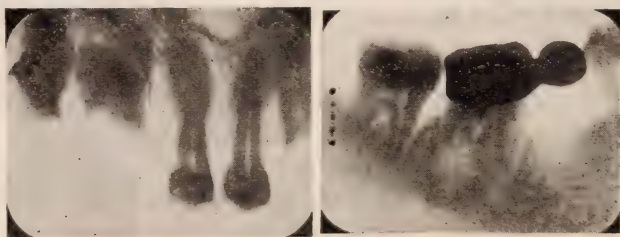
Now to refer to *Fig. 1* and the unerupted and incompletely-developed teeth, it can be noted that about each tooth which has not erupted a distinct line of limitation of the tooth-bud can be distinguished. As the teeth develop this line disappears over the crown of the tooth but continues periapically, following closely on

the forming apex. It will be found that the line just described depicts the *lamina dura* or limiting wall of the tooth socket.

In the normal tooth pictured by the peneto-ray, the *lamina dura* or socket wall can be traced about every tooth and usually can be seen about the apex of every root. As long as conditions remain normal this thickened area or line remains unbroken. It is pictured as Grade 2 B shadow in close and equal proximity to the shadow of the tooth, which also is in Grade 2 B, and is separated from it by an equally thick line pictured in shadow of Grade 1. The Grade 1 shadow in this instance represents peridental membrane.

It is possible for many combinations of conditions to cause a variation in the thickness of the peridental shadow. A simple congestion may not affect the shadow, but the continuation of such a congestion to a point where an alteration in the bone shadow takes place certainly will be pictured. This alteration may take place as pictured in A of Fig. 2, where infection has destroyed the alveolar process periapically and increased the amount of Grade 1 shadow.

Fig. 3



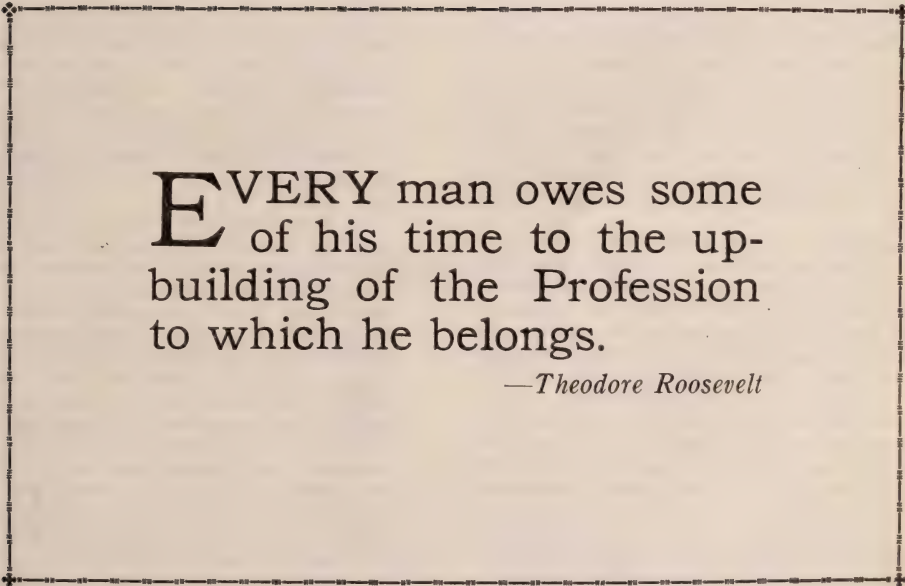
A

B

Figure 3 A shows a fairly normal amount of peridental shadow and a fairly perfect line of *lamina dura*, yet an abnormally-thickened root end. (This is the condition of hypercementosis.) In B of Fig. 3 can be seen an increase of the shadow of Grade 1 which has taken place at the expense of alveolar tissue and root substance, through absorption of the latter. Here we note the replacement of Grade 1 shadow in the positions where we know Grade 2 A and Grade 2 B should be.

These illustrations should serve to show how important it is for one to understand the meaning of the various grades of shadows and to know their normal anatomical extent. What might appear as a pathological area under some conditions may be perfectly normal under others. It is imperative therefore to observe a number of cases of normal conditions and to know within what latitude the normal may range. It is therefore urged that a great number of pictures be taken for study in a variety of cases, rather than to content oneself with a picturing of these obviously pathological, to

learn what it looks like. The growth and development of teeth can be watched and in no better way than with the penetogram. There is no method by which progress of growth of any area, bone or cystic, which might occur about the jaw, can be as easily watched as by a penetogram. The progress and the result of any form of treatment can be correctly noted and followed with the peneto-ray. It is our most accurate criterion of bone healing. However, to be useful it must be understood.



EVERY man owes some
of his time to the up-
building of the Profession
to which he belongs.

—Theodore Roosevelt

LEGAL DEPARTMENT

CONDUCTED BY ELTON J. BUCKLEY, 643 LAND TITLE BUILDING, PHILADELPHIA, PA.

Don't Be Caught When You Receive Goods Different From Those Ordered.

When a man orders certain goods and receives something wholly different, what ought he to do in order to protect his interests? Ought he to hold the goods sent him until the right ones come, or ought he to send them back, or can he hold them until the seller sends for them? Or, if part are right and part are wrong, can he hold the former and return the latter?

Sometimes this question presents itself in puzzling forms, and unless a man knows what he is about he may, in the language of the street, get in wrong. The whole matter is referred to me by a correspondent with a suggestion that an article on it ought to be valuable and interesting.

When goods sent you are not in compliance with your order, it is necessary for you to do something about it at once. If you simply put the goods aside on the theory that "I didn't order them; it isn't my funeral," you will find a little later that it is your funeral, or at least that you are chief mourner. You cannot afford to do anything like that, but on the contrary you must declare yourself one way or the other at the earliest practicable moment.

I remember a case which will serve as a good illustration for what to do and what not to do along this line. A retail clothing dealer ordered certain goods. When the shipment arrived he found that some were what he ordered, but the balance were not. He kept what he had ordered, and returned the balance, certainly a sensible proceeding, apparently, but nevertheless one that got him into all kinds of trouble. The seller refused to accept this settlement, but sued the buyer for the purchase price of the whole shipment. The buyer had no concern about the matter, feeling sure that any jury would sustain him in what he did. But his counsel, after examining the law, did feel a great deal of concern about it, and this concern was justified by after-developments, for the court gave judgment against him for the full amount. He appealed, but the Appeal Court affirmed the judgment. He had to pay out a considerable sum of money because he did not know how to act in a crisis.

The court in this case said that the buyer was wrong in keeping part of the shipment and returning the rest. He should have returned it all or he should have kept it all, and in the latter event, when the seller sued him, set off against the purchase price the difference between the value of what he got and what he should have got.

The following extract from the decision is a pretty good thing to know, for it cites the whole law in a very clear way:

When the merchandise was received by the defendant, he had the election, after an inspection of it to retain it or return it to the vendors (sellers) and rescind the contract. It was not his privilege, however, to affirm in part and rescind in part. If the clothing did not correspond with the sample, the defendant was not bound to accept it, but in order to avoid the obligation of the contract, it was his duty to return the property to the vendor. Where after having an opportunity for examination he retained and sold a portion of the merchandise, he was not at liberty to return the balance. If it were otherwise the vendee (buyer) might select the best of the property bought and return that which in his opinion is of inferior quality without an opportunity on the part of the vendors (sellers) to make themselves whole. If his desire is to rescind, he is not permitted to exercise acts of ownership over the property, nor to control it except as may be necessary to put it in the way of return to the seller.

If it be alleged that the goods delivered did not conform to the standard established by the contract, the vendee (buyer) if he elects to retain all the goods may prove this fact in abatement of the contract price, because the consideration has failed to the extent of the difference in value between the thing delivered and that which was contracted for. But the buyer in this case did not avail himself of either of the methods allowed him. He neither returned the consignment and annulled the contract, nor did he retain the shipment and seek to show the difference in value between what he received and what he ought to have received.

To make this clear beyond all question, the buyer who receives goods not like what he ordered, either wholly or in part, or goods not according to sample, either wholly or in part, can and must do either of two things: 1, send them all back, good and bad together, or 2, hold them all and if part or all of the lot are poorer than those he bought, demand a reduction in the price. The second course wouldn't work, however, where the goods sent are not poorer, but merely different from those ordered, because then there could be no reduction in price to make him whole.

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SOCIETY ANNOUNCEMENTS

The American Society of Dental Radiographers

The annual meeting of the American Society of Dental Radiographers will be held at the Ambassador Hotel, Los Angeles, Calif., Wednesday and Thursday, July 19 and 20. The Program Committee has arranged for an interesting and scientific meeting. All those extremely interested in Dental Radiography are cordially invited to attend.

M. C. MCKITTRICK, *President*,
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501 Fifth Ave., New York, N. Y.

Delta Sigma Delta Fraternity

The thirty-eighth annual meeting of the Supreme Chapter of Delta Sigma Delta Fraternity will be held in the Alexandria Hotel, Los Angeles, Calif., on Monday, July 17, 1922, at 9:30 a. m.

Those expecting to attend should promptly notify Dr. Frederick M. Hunt, 709 Walter P. Story Building, Los Angeles, Calif.

By order of the Supreme Chapter,
CHALMERS J. LYONS, *Supreme Grand Master*.
R. HAMILL D. SWING, *Supreme Scribe*.

Psi Omega Fraternity

Headquarters, Clark Hotel, Los Angeles. National Alumni Chapter meeting, Monday, July 17, 10:00 A. M., ballroom Clark Hotel. Annual banquet, Monday evening, Los Angeles Athletic Club.

A three day motor sightseeing trip, from San Francisco to Los Angeles, has been arranged for those routed that way. Make reservations for this wonderful 700 mile scenic drive by communicating with Dr. Frederick T. West, chairman Psi Omega Caravan Committee, 2509 Mission St., San Francisco.

American Dental Library and Museum Association

The next annual meeting of the American Dental Library and Museum Association will be held Monday, July 17, at the Hotel Ambassador, Los Angeles, Calif.

The membership consists now of over forty dental libraries, and we trust that all dental institutions owning a library will join same.

In order for the Association to accomplish its purpose it will be necessary and an advantage to all dental libraries to be members. Any institution or individual interested in dental literature or history are eligible for membership.

B. W. WEINBERGER, *Secretary*,
40 East 41st Street, New York.

Meeting of the National Alumni Chapter of the Psi Omega Fraternity

The National Alumni Chapter of the Psi Omega Fraternity will hold its next meeting on Monday, July 17, 1922, at the Clark Hotel, Los Angeles, Calif. The Chapter will be called to order at 10 a. m. There will also be an afternoon meeting and an informal banquet at 8 p. m. at the Los Angeles Athletic Club, at which the Psi Omega ladies will be the guests of the Fraternity. A large attendance is desired. Every Psi Omega should register immediately on arrival in Los Angeles. Headquarters will be maintained during the national meeting at both the Ambassador and Clark Hotels.

MAX WASSMANN, JR., *Grandmaster National Alumni Chapter*.

I will not believe that the American spirit, distilled from all the best of Europe, will tolerate this surrender of the future, this quite hoggish abandonment of the leadership of mankind that continuing isolation implies. The American people has grown great unawares; it still does not realize its immense predominance now in wealth, in strength, in hope happiness and unbroken courage among the children of men. The cream of all the white races did not come to this continent to reap and sow and eat and waste, smoke in its shirt-sleeves in a rocking-chair, and let the great world from which its fathers came go to hang. It did not come here for sluggish ease. It came here for liberty and to make the new beginning of a greater civilization upon our globe. The years of America's growth and training are coming to an end, the phase of world action has begun.

—H. G. Wells

The Ney Service

No matter what item in the field of dental metallurgy your practice may require, remember that Ney makes it. If there is any question regarding your source of supply, write to us for the names of dealers who will promptly furnish it. And, if you wish it, our Technical Department will gladly answer questions as to its application.



THE PIONEER  JOHN M. NEY	<i>The</i> J. M. NEY COMPANY FOUNDED IN 1812  President HARTFORD CONNECTICUT, U.S.A.	NEW GOLD FOR  OLD GOLD, SILVER PLATINUM ETC.
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NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

Diet and the Dentist

Never has there been among dentists the degree of intelligent interest manifested in the most important subject of diet as at this time; and never was an interest more timely.

So far as he is personally concerned, the very nature of the work of the dentist, his indoor pursuit, coupled with the nervous strain under which he is obliged to earn his livelihood, makes him particularly susceptible to the evil effects of an improper diet, confined very largely, if not for the most part, to the conventional "high-grade American diet" that McCollum, McCann, McCarrison, Mercur and others so emphatically and uncompromisingly declare to be just about as unsatisfactory as well could be devised. From the standpoint of his professional experience he has been so profoundly and so frequently disappointed in the result of his finest operations so far as the health of his patients is concerned, that he is quite ready for the verdict of men who have made the subject a special study. And this verdict is to the effect that:

We might as well put a new roof on a house that is burning down as to expect dental service to restore health to a patient whose system is loaded with toxic products of malnutrition, the result of just about the most unsatisfactory diet from the nutritional standpoint that possibly could be devised, one that has been tested to a finish by men whose lives have been devoted to the subject.

As everybody knows who has read my lucubrations in the pages of **THE DENTAL SUMMARY**, I have been interested in every phase of the subject of diet for many years. In that time some discoveries have been made and apparently checked up by experience that have not, as yet, been reached by what may be termed "official science." These have been presented to several State and other dental organizations who have done me the honor to include my papers in their programs, but not in such form and manner as to be permanently useful—or not so much so, at least, as might be desired.

Upon several occasions suggestions have been made to me that some sort of organization be effected by which co-operative interest and effort might be brought about to the end that all that is known might be placed in the hands of the dentist in permanent and readily usable form. Accord-

ingly, a letter, dated May 20, was prepared and mailed to a certain group of dentists who had shown more than usual interest, asking their opinion as to feasibility and usefulness of such an organization. A sufficient number of replies have been received to warrant continued effort, along the lines shown in the following Bulletin, which was issued about the middle of June, and which may be taken as an index of the lines of activity contemplated.

DEFENSIVE DIET LEAGUE OF AMERICA

Bulletin No. 1

"The Knowledge of the Essentials of Diet Should Be part of the Mental Equipment of Everyone Who Eats"

A successful and happy life is impossible unless both mental and physical well-being are continuously maintained.

Professional and financial success rests squarely upon the efficiency of one man—yourself; and your efficiency depends wholly and entirely upon the end-products of digestion that reach the blood stream and through it the tissues of the body.

These end-products must contain everything that is needed to build blood, brawn and brain; and their contents depends entirely upon the materials that you supply to your digestive apparatus through the foods you eat.

This question of Diet has been dodged and sidestepped far too long. We must face it, conquer it and control it, unless we are willing to see our race continue to deteriorate until it reaches the level of the decadent peoples of the South Seas.

If the faults in diet are not serious their outward and visible signs may be slow in appearing, particularly if the constitution is a sturdy one, equipped with tremendous resisting power; but they are sure to appear eventually in lowered vitality, low resistance to colds and infections, early aging and premature senility and death.

If you think you may be exempt, suppose you take a walk through some populous cemetery and note the average age recorded upon the stones erected to the memory of

men and women who have "lived not wisely but too well" in a dietary sense. Note that by far the greatest number bade farewell to earth and earthly things between the ages of forty-six and fifty-six. A man ought to be ashamed of himself to die at any such age. On the contrary, he should be just beginning to know how to live. It takes about fifty years to learn the "trade of living."

Early aging is rapidly increasing in America. Nearly five hundred thousand die annually from old-age diseases. Of these *Sixty Thousand Die under the Age of Forty*. It's positively disgraceful. Imagine a sane man dying of an "old-age disease" under forty. It would be a joke if it were not so tragic. And 105,000 die between the ages of forty and sixty.

Mortality from old-age disease, simply pre-senility, has increased ONE HUNDRED PER CENT. in thirty years—and bids fair to double again in the next twenty years.

Not only is the span of life shortened by these diseases, but the Productive Efficiency, the capacity of the individual is impaired at just the time when he should be at the peak of his efficiency.

Family nutrition is the most important factor that contributes to this condition.

The first three inches of the alimentary canal and the materials that enter the body through it in the form of foods and drinks stand at the head and front of all the factors that enter into the problem of long, comfortable and effective living.

It is now KNOWN that our diet must contain the acid and alkali-forming foods in correct combination; a variety of minerals in the form of assimilable salts; (iron, for instance, can be had only through our foods. McCollum says that it is doubtful if any atom of iron ever entered the system in any other way, even though gallons of tincture of iron have been prescribed and swallowed) and particularly certain vital elements called Vitamins A, B, and C, which is to the food-mass what the spark is to the gas-charge in your auto-engine. They also have certain definite preventive and curative qualities, and their absence from our foods causes much suffering, under-development and shortening of life.

Vitamin A is anti-rietic and anti-ophthalmic; vitamin B, anti-neuritic; vitamin C, anti-scorbutic.

Some foods are Vitamin-dead; refined sugar, manufactured forms of starches, highly-refined cereal grains, polished rice, farina, pearl barley, white breads, etc. Meats contain very little of them, and that little usually is driven off by cooking.

Such foods are of very little use to anybody unless combined with live foods; milk, greens, fresh fruits and vegetables. These contain all the vitamins; also the mineral salts that are necessary. But their influence is either destroyed or greatly modified by the

IPANA

TOOTH PASTE

Heals Bleeding Gums

—So thousands of dentists
have told us—

Recommending a tooth paste that merely cleans the teeth is easy.

Recommending one that just tastes nice is likewise a simple task.

But to know and recommend IPANA—that cleans the teeth thoroughly and without harm, that has a smooth, snappy and delightful flavor and Heals Bleeding Gums—is a duty you owe to others.

*You and your patients
should know and use
IPANA.*

A Professional sample awaits your card.

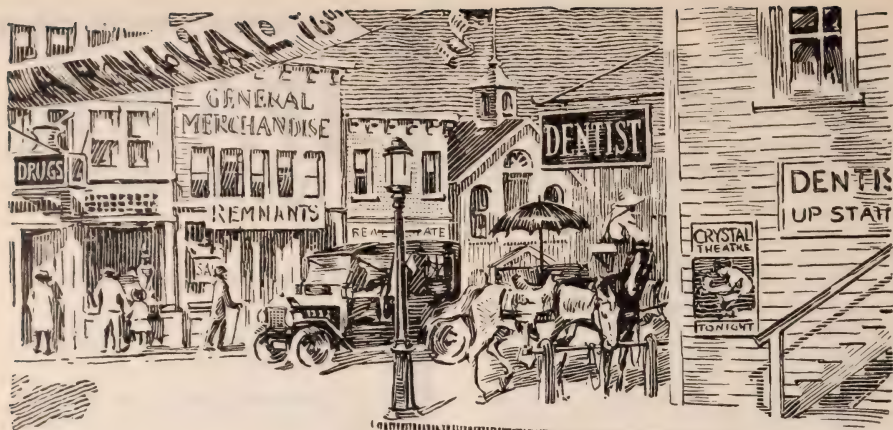
BRISTOL-MYERS CO.

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Makers of SAL HEPATICA





Another Breezy Letter

from the Western Dentist

YOUR letter at hand, but I wish to say that your argument against going to the public does not hold water at all. You say, "What argument do I put up when the lady 'busts' into the office, demanding Blank's teeth which she has seen advertised." Why, my dear sir, I reach up into the cabinet and yank down the Gysi Articulator on which is a correctly ground and mounted set of Trubyte Teeth and demonstrate to the lady why, owing to the correct shape of the cusps, it is possible to correctly balance them in every position of the lower mandible. Right there the lady sees the point and she says, "But, Doctor, I don't want teeth that are all rough on the front of the incisors, I want them smooth and white;" and then I explain to her that that is done to give a natural appearance to them. She says that her teeth were not that color or size or shape and were perfectly smooth.

I then call in daughter, or my assistant, and match color from

TC guide, and show her that she is mistaken. Also I have mounted three sets of the best imitations and I demonstrate that it is an utter impossibility to set up any of them to get as correct an occlusion in the different movements of the mandible as it is with Trubyte Teeth. Last I show her the gum section and old plane line set up on plane line articulator, and if she is wearing a misfit set of dentures I take wax bite with dentures in place, place in articulator and show her that they are not articulated properly.

Of course, this takes time. But do you suppose that I expect to sell denture service like I would potatoes? Not so. No man can sell denture service unless he expects to take time in doing so and if we who pay \$500 per year for post graduate in-



"I'm going to lead him up to Kansas City."

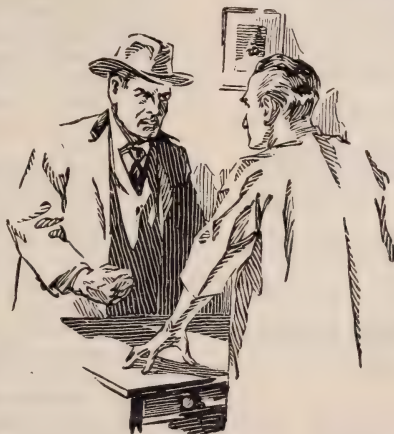
struction—not taking into consideration loss of time from practice—did not take time and patience to counsel and explain to our patients, we could not get sufficient fees to live. The lady you spoke of busting into my office last Wednesday asking me why I wanted \$60 for an upper denture of Trubyte Teeth, when the nice young man up the street only wanted twenty for a set of other teeth. As I said before, I demonstrated, with the result that on Monday I inserted the denture and she phoned me that she attended a bridge party that afternoon and had worn them with comfort ever since and would be in this P. M. to pay me the balance of \$20; also that another

lady would accompany her who was having trouble with a full denture.

Now this other chap is a new man here, good operator, but knows very little about dentures. I am going up and take him by the ear and lead him up to Dr. House April 10th, at Kansas City, and as I am the man who took his application into the Association last year I feel that he should learn something about full dentures, especially as his office is in the next block.

Dr. ———, however, is not the competitor who advertises Trubytes at \$25 full case. That fellow's case will take care of itself as he also

guarantees to "cure pyorrhea and kill nerves." To such men as Dr. ——— should be sent the demonstrator, as advocated in my other letter. Also about two months ago Joe Payne, a contractor here, busted into the office with a set of dentures which he had paid \$60 for, and which were as near as I could judge ordinary pre-Trubyte molds, not at all suited for him in size, length or shade. I fitted him up with the longest long square that you list and turned him loose, telling him he owed me \$150. He kicked, but wore them two weeks and came back and gave me a check for full amount, and now I am making him a duplicate upper.



"He kicked but gave me a check for \$150."

Still Joe says that he sees where they make teeth in Oklahoma City for \$8.00 per set. I will admit that there is no way to regulate the price of that kind of service. For I could in any country town where my overhead is not as great as it is here cut my prices in half or less and make money and still give as good service.

And now I will subside.

When I return from Kansas City I will know more both as to conditions about the opinions of the profession on various matters and what they think of advertising Trubyte Teeth.

R. E. M.



Ever Make Impression Plaster?

Suppose you did. You would make it fine, strong and snow-white and have it set in the time best adapted for your work. When you were finished it would embody all the desirable features an impression plaster could have—wouldn't it?

Now get a can of

R. & R. Impression Plaster

and see just what an excellent product you would have.

Your dealer has it.

THE
Ransom & Randolph Co
Toledo, Ohio

ordinary continued cooking to which most of them are subjected. Vitamin A is destroyed at 240; B at 220; C at 120 degrees Fahrenheit. Most vegetables may be perfectly cooked at much lower temperatures; but the average cook knows nothing about that. Therefore, the safe thing is to eat as many raw vegetables, fruits, etc., as you can, particularly as the anti-scorbutic element "C" is destroyed by any heat above 120 degrees. We should consider the vitamin content of foods first of all, and see that we get an ample supply. Forget about calories for a while.

The following uncooked salads contain all of them. See that you are served one or more of them a day:

Mince very fine—Cabbage, onions, young carrots, and radishes. Mix lightly (marinate) with cooked salad dressing. Eat a dinnerplate full, everyday; especially with every meal at which meat is served. A combination of any two of the above will do very well.

Minced cabbage is delicious with grapefruit, oranges and pineapple, or in any fruit salad. May be used as a bed in which the salad is served, or mixed with the fruit.

Minced cabbage with tuna-fish with boiled dressing is very fine, as is also tomato and cabbage. Cabbage is one of our best vitamin foods, and is particularly fine just now, when the small, crisp hothouse heads may be had. Experiment with cabbage in other combinations.

Quarter tomatoes and sprinkle with finely ground carrots. Tomatoes and pineapple are very good. Tomato and onion is a well-known combination.

Never use or serve vinegar. Use lemon-juice instead. Lemon-juice contains vitamins, and in an easily available form.

Next month's Bulletin will contain tables showing the distribution of the three vitamins in common food-stuffs; also a discussion of the mineral foods, such as calcium, iron, phosphorus, etc.

Pythagorus said: "Without phosphorus there is no thought." This mineral enters into the composition of nerve-fluid, brain and other tissues, and is needed in the conduct of nerve-stimuli to their end-point. Do you know the foods that contain it?

Scientists say that we as a people are too near mineral starvation to continue to eat foods by rule of thumb.

These Bulletins are issued monthly to members. If interested,—if you want more of this information and much other helpful material, for personal and professional use, send your name and address to me, and you will receive a reply promptly.

Please understand that this is no mere dietary fad or cureall with some wonder-working "health-food" to sell, but has for its sole aim and purpose the increase and spread of intelligence concerning the prop-

erties, proportions and proper preparation of our common foods. Eat what you please, but you may as well be intelligent about your eating as is the farmer or stockman about the foods he gives to his cattle, horses, sheep and hogs.

Sometimes as little as four percent of a certain element added to an otherwise destructive diet converts it into a defensive and protective one.

There is in this country and at this time a wide range in the choice of foods. Make up your own diet, but do it with judgment based upon knowledge, not in the usual haphazard manner, based solely upon ignorance and custom.

If you prefer to commit suicide, why not do it quickly, by one of the well-known and dependable methods, rather than drag it out through long years of suffering by the destructive-diet route?

DEATHS

At Rochester, Ind., May 16, Dr. Perry Heath, prominent in dentistry and civic affairs.

At Albany, N. Y., May 16, Dr. Moses F. Kirwan, aged 52.

At Los Angeles, Calif., May 18, Dr. Edward Chandler, formerly of Calumet, Michigan.

At Columbus, Ohio, May 20, Dr. Horace C. Dean, aged 40.

At Binghamton, N. Y., May 20, Dr. George Pulver. He was drowned while fishing in the Beaverkill stream, near Roscoe, N. Y.

At Iowa City, Iowa, May 22, Dr. Al Horrabin, aged 45.

At Hohenwald, Tenn., May 22, Dr. Cleo Boles, aged 28. Until six months ago he was assistant Dental Professor at Vanderbilt University and resided in Nashville, Tenn.

At New Rochelle, N. Y., May 23, Dr. V. E. N. Cook, aged 73.

At Los Angeles, Calif., May 24, Dr. A. J. Schnessler, aged 50.

At Somerset, Pennsylvania, May 24, Dr. Samuel J. McMillan, aged 73. He was fatally injured while trimming trees at his home.

At East Orange, N. J., May 23, Dr. George Howe Winkler, formerly a leading dental surgeon in Augusta, Ga., aged 74.

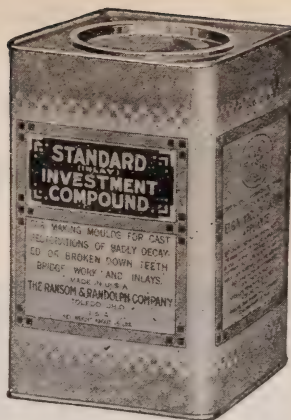
At Davenport, Iowa, May 25, Dr. J. B. Morgan. He had practised in Davenport 53 years and said to be the first graduate dentist to practise in Iowa. Aged 83.

At Moundsville, W. Va., May 24., Dr. John A. Miller, aged 45.

At Trumansburg, N. Y. May 25, Dr. A. H. Hill, suicide by shooting, aged 50.

At Decorah, Iowa, May 26, Dr. D. C. Cutler, Pioneer citizen, aged 90.

At Ellsworth, Me., May 29, Dr. Harvard Greeley believed to be the oldest practicing dentist in Maine, died after illness of only a few days, aged 78.



Standard Investment Compound

has proven itself to be always reliable and adaptable to all kinds of casting.

STANDARD IS TRULY A
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*All Dealers Have
"STANDARD"*

**The Ransom & Randolph
Company**
TOLEDO "50 Years of Service" OHIO

For your patients' use The Cotto-Tooth-Brush

(Johnson & Johnson)

(Absolutely Sanitary)

A modern toilet luxury for cleaning and polishing the teeth

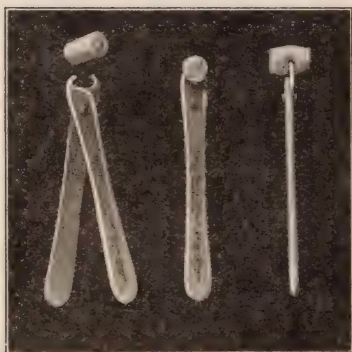
Always New Always Clean

A fresh Cotto-roll for each cleaning

The use of the Cotto-Tooth-Brush with a good dentifrice imparts a high polish to the surfaces of the teeth that is of great value in preventing decay and is noticeable at once in their appearance.

The Cotto-brush for polishing the teeth, used in conjunction with the bristle tooth brush and surgically clean dental floss silk for cleaning between the teeth, makes an ideal toilet equipment for their proper care.

Your dealer will be pleased to show it to you. Explain its value to your patients and refer them to your regular dealer for it.



Ivory Finish Handle and twenty Cotto Rolls complete. per box 85 cents
Additional Special Cotto Rolls. 100 in box 35 cents

Sold by leading Dealers in Dental Supplies

JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.

At Great Neck, L. I., May 30, Dr. Joseph B. Brown, formerly a practicing dentist in Brooklyn for 50 years. He retired from his profession a year ago. Aged 86.

At Spokane, Washington, June 2. Dr. Robert Rude, aged 26.

At Salt Lake City, Utah, June 3, Dr. D. F. Gurnsey, aged 28.

At New Wilmington, Pa., interment June 6, Dr. James A. Van Orsdell.

At Frankford, Pa., June 5, Dr. Albert M.

At Brockton, Mass., June 17, Dr. Jas. S. Thorndyke, aged 63.

Bradner.

At Holyoke, Mass., June 7, Dr. J. S. O. Mitiver, aged 52.

At St. Joseph, Mo., June 11, Dr. Karl E. Osborn, aged 30.

At Syracuse, N. Y., June 12, Dr. George E. Girand, stricken with apoplexy at his office and lived only a couple of hours. Aged 47.

Idaho State—V. H. Hudson, president; F. W. Critchfield, vice-president; M. J. Goode, secretary and William Luddon, treasurer.

Wabash County, Ind.—C. J. Snideman, president; M. A. Payne, secretary-treasurer.

South Dakota State—Oscar W. Hansen, of Madison, president; Bert Kerr, Huron,

vice-president; C. K. Walker, Huron, Secretary; A. A. Wallman, Huron, treasurer; G. R. Lanning, Sioux Falls, editor and manager of Bulletin, Huron next year.

Rehwinke (So-central Ohio) C. W. Soders, Washington, C. H., president; J. A. B. Srofe, Leesburg, vice-president; C. V. Lannum, Washington, C. H., second vice-president, M. G. Phillips, Chillicothe, secretary-treasurer; C. H., Martin, deligate to State meeting.

Southern Minnesota—C. P. Peterson, Mankato, president; E. S. Johnson, Waterville, vice-president; G. W. Norris, Tracy, secretary-treasurer; J. W. Inglis, Redwood Falls, executive council.

North Carolina State—R. S. Harton, Raleigh, president; R. M. Morrow, Burlington, and B. F. Hall, Asheville, vice-president; H. O. Lineberger, Raleigh, secretary; E. G. Click, Elkin, treasurer; L. G. Cable, Greensboro, essayist; E. H. Wheeler, Greensboro, and I. S. Spurgeon, Hillsboro, state examiners. Asheville next year.

Colorado State—A. C. Withers, Denver, president; Z. T. Roberts, Rocky Ford, vice-president; H. W. Wilson, Denver, secretary; William Smedley, Denver, treasurer.

Northern, Pennsylvania—E. W. Walford, Brookville, president; I. E. Clark, St. Mary's, vice-president; J. B. Nelson, Du-

Bois, secretary; L. L. Means, Reynoldsville, treasurer.

South Carolina—J. P. Glenn, Spartanburg, president; David Aiken, Winnsboro, and Herbert M. Hucks, Georgetown, vice-presidents; E. C. Dye, Greenville, recording secretary; J. S. Boyd, Edgefield, directing secretary; W. B. Simmons, Piedmont, dental examiner.

Indiana State—Dr. Earl Brooks, Noblesville, became president of the Indiana State at the annual meeting May 16, Charles A. Priest, Marion, president-elect. The meeting was well attended, the program unusually full and interesting, and everybody was happy. Papers will appear in the Summary as usual.

There is no better starch food (carbohydrate) than natural rice—unpolished and uncoated; and there is hardly a poorer food than the denatured, usually talcum-coated stuff commonly sold for rice, lacking in three necessary food elements; and containing less than sufficient of several others. If you are fond of rice, and want the real thing, write to me and I'll tell you how to get it.

Do you like the genuine, old-fashioned, unemasculated cornmeal of our granddads? If you do, I'll tell you where to buy it.

Dr. Chas. Guebel, of the Dental College of Paris, France, reports complete success

Classified Advertisements under this heading, \$2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more special rate on application.

FOR SALE—Complete equipment of the office of the late Dr. H. F. Bailey, consisting of two S.S.W. chairs, two Weber cuspidors, electric engine, cabinet, laboratory outfit, reception room furniture, all kinds of instruments, desk, etc., located at corner Main and Sixth streets, East Toledo. Must be sold at once. Inquirers may call at any time or address—Mrs. H. F. Bailey, Main and Sixth streets, Toledo, Ohio. 710-P

FOR SALE—\$10,000 practice on East State street, Columbus, Ohio. Modern equipment including X-Ray. Reason for selling, am going into another business, but will stay with buyer for some time if desired. Address The Dental Summary, Box 720-C.

FOR RENT—Some large, airy rooms, suitable for a dental office. Located at 2660 Woodhill Road in the center of a well populated community. Address Cleveland Drug Company, 2660 Woodhill Road, Cleveland, Ohio. 710-C

BACK NUMBERS OF THE DENTAL SUMMARY. Volumes for the years 1911-12-14-15-16-17. Also broken files of 1909-10-13 and 1918. These volumes are for sale by the widow of a well-known dentist who practiced in Indiana. THE DENTAL SUMMARY has offered to find a market for these numbers through its columns. Anyone desiring any of these numbers please address this office and your order will be forwarded. These volumes should be worth at least \$1.00 C.O.D. THE DENTAL SUMMARY, Drawer 906, Toledo, Ohio. 720-P

in the use of oxygen alone in anesthesia, applied by means of an apparatus designed by Dr. Fabret. We shall watch for succeeding reports of experience in the new process.

Conditions in the dental trade and profession in Europe are chaotic in the extreme. There is disharmony, antagonism and bitter competition everywhere. The war has completely disorganized if it has not destroyed the spirit of ethical harmony and

CORRECT ENGLISH Monthly Magazine

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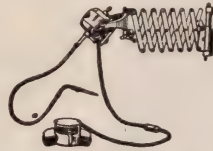
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Materially Aids
Local Treatment

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PYORRHEA

Samples on Request

Bristol-Myers Co.
NEW YORK



professional consideration that is so prevalent in this country. And it will be a long time before it again asserts itself.

Dr. Morinosuki Chiwaki, president of the Dental Federation of Japan and the Tokyo Dental College, is on his way to the U. S. A. via Europe. He comes to study our colleges with regard to instruction and administration.

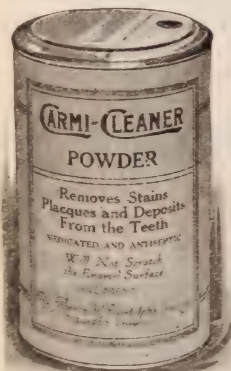
The 1922 Meeting of N. O. D. A.

Everybody expects the Northern Ohio meeting to be just about the king-bee each year. Thus far in my experience nobody ever has been disappointed. With men like Mc-

Collum, Sparrow, Thompson and Cummer on the program this year, there could not well be a dull minute from start to finish, and of course there wasn't. Some of the best material ever presented at a dental meeting was given June 5-9, most of which will appear in our pages during coming months. When men with the energy and perseverance of such people as Drs. Welker, Gentilly, Hartshorn, Wilson, Phelps and Henahan get really busy on a job, something is sure to happen—as something always does happen over at Cleveland during the early days of June.

CARMI CLEANING AND POLISHING POWDERS

Medicated and Antiseptic



FOR CLEANING TEETH

A medicated antiseptic Cleaning Powder, in successful use for many years. Quickly removes infectious matter and all stains, leaving a smooth, unabraded surface, ready for polishing.

Small Size	-	-	-	\$.65
Large Size (7 oz.)	-	-	-	1.25
3 Pound Can	-	-	-	6.00

CARMI LUSTRO POLISHING POWDER

A medicated antiseptic, non-abrasive Polishing Powder, the first material ever offered for restoring the brilliancy to tooth enamel, no matter how lost.

POLISHES WITHOUT WEARING

Works by friction, not by abrasion. Restores highest brilliancy without injury to teeth.

Small Size	-	-	-	-	-	-	-	\$.65
Large Size	-	-	-	-	-	-	-	1.25

An Unequaled Polishing Powder

Your dealer can supply you with CARMI Products

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 TOLEDO, O. U. S. A.
 CLEVELAND AKRON DETROIT FLINT GRAND RAPIDS
 COLUMBUS INDIANAPOLIS



THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XLII

AUGUST, 1922

N. J. 8

FOCAL INFECTIONS AND HUMAN DISEASE.*

BY AARON ARKIN, A. M., M. D., WHEELING, W. VA.

I FEEL highly honored by the request of one of our officers to present an address on a subject of great interest to the medical and dental profession, Focal Infections and Human Disease. This invitation I was glad to accept as further indication of the many common interests of our professions. In this age of specialization we have been drawing farther and farther apart, until the recent discoveries of the relation of circumscribed areas of infection in the oral cavity to many systemic diseases. These developments necessitate close co-operation between the expert dentist and the clinician or internist in the accurate diagnosis and treatment of the diseases which I shall discuss.

Many serious complications arise from gingivitis, pyorrhea alveolaris, infections of unerupted and impacted teeth, and infections at the apices of the teeth; and the dentist must become acquainted with these facts. Indeed, the close relationship between dentistry and medicine will require the adoption in the near future of the same standards and requirements by dental schools as are now enforced by the Class A medical schools of this country. Dentistry is a branch of medicine of equal importance and dignity with any other specialty of medicine or surgery. I think that dentistry has made more progress in the last few years than any other profession, thanks to the affiliation of the dental schools with universities and the establishment of laboratories and clinics for dental research.

Today the dentist must give more of his time and attention and skill to the great problem of oral sepsis in its important bearing on general health. He must take a more active interest in mouth hygiene, which will be the solution of the problem. The day must come when every child will possess a clean mouth free from decay, and the dentist's work will become more and more prophylactic rather than reparative.

*Read before the West Virginia State Dental Society, April 1922.

The causes of systemic or general diseases were unknown until a half century ago. In ancient times diseases were considered to be due to evil spirits entering the body from without. This view gave way to the Greek school of medicine which advanced the humoral theory of disease, about 2,000 years ago. Little real progress in the knowledge of disease was made until the epoch-making discoveries of Pasteur and Koch who founded the science of bacteriology about 50 years ago. With the development of culture media, for the cultivation of bacteria outside of the body, came the isolation of one germ after another as the causes of infectious and contagious diseases. The germ theory of disease, now an established fact, teaches us that all transmissible or communicable or infectious diseases are caused by a "*virus animatum*" a living germ or micro-organism, which must enter the body to cause diseases. In other words, every case of infectious disease is a condition of parasitism in which the human body is the host and the germ the parasite. There is then a battle for the survival of the fittest, and often the host kills the germs and recovers; at other times the germs get the advantage and kill the host. The great discoveries of modern preventive and curative medicine have resulted from the developments in bacteriology and immunology.

Today most of the infectious diseases have been conquered by organized administrative efforts at betterment of living conditions, sanitation, immunization with vaccines and sera, isolation and quarantine, disinfection, etc. The result has been that the average duration of human life has been lengthened from 22 years 50 years ago to about 38 years at present. More people reach middle life than ever before, with the result that many weak individuals are being saved by preventive and curative medicine. Formerly only the physically fit survived; but today the unfit are also being saved by medical science. Perhaps this is one reason why the chronic diseases of middle life, such as organic heart diseases, Bright's disease, arteriosclerosis and cancer are increasing rather than decreasing in civilized countries.

In this address I wish to call attention to the important part played by focal infections, especially of the teeth and tonsils, in the causation of many acute and chronic systemic diseases, such as valvular heart disease, Bright's disease, various forms of acute and chronic arthritis, arteriosclerosis, etc. The importance of some of these diseases can best be realized when I call your attention to the fact that organic heart diseases led the list of causes of death in United States last year, causing about 145,000 deaths. Next came tuberculosis with about 130,000, then pneumonia, 125,000; Bright's disease, 100,000, and cancer about 80,000. In three of these (heart diseases, tuberculosis and nephritis) focal infections play an important part.

The recent war demonstrated that 37% of our young men of military age were physically or mentally unfit for military duty. Of the defects which unfitted over one-third of the men examined, 88% can be classified under six heads:

Diseases of bones and joints	26
Special senses	15
Cardio-vascular	13
Nervous and mental	10
Tuberculosis	9½
Defective physical development	8

Much of this physical disability begins in early life when it is preventable. Over 80% of school children have illnesses or defects, many curable. They are decayed teeth, enlarged tonsils and adenoids, middle ear infection, errors of refraction, tuberculosis, etc. Many of these are the focal infections which are responsible for the high per cent of physical and mental disability in later life.

A focal infection is a circumscribed area of infection with pathogenic bacteria. These primary foci are found in tissues communicating with surfaces, while secondary foci may develop from these by the passage of germs through the tissues, blood or lymph vessels. The most important primary foci are infections of the teeth and gums, tonsils, adenoids, nasal sinuses (maxillary, frontal, mastoid,) middle ear, lung cavities, chronic bronchitis, the fallopian tubes, prostate gland, appendix, gall bladder, seminal vesicles and chronic suppurations of skin or mucuous membranes.

I shall confine my discussion largely to infections of the teeth, in which you are chiefly interested. As dentists, you gentlemen know better than I how few children have two good sets of teeth, probably not more than two out of every hundred children examined. Recently I examined 100 school children for tuberculosis, and found on routine examination of the mouth not one without tooth decay. They had an average of six decayed teeth. Is it any wonder that infections at the roots of teeth are so common in later life? This condition will continue unless we adopt a definite program of mouth hygiene for school children.

William Black has stated that 25% of people have septic mouths at the age of 25 years and at 45 years nearly 90%. Of course not all of these people develop systemic diseases, for the body normally possesses remarkable defenses against the spread of infection. There are bactericidal and antitoxic substances in the body fluids and leukocytes which reach the infected area in large numbers and eat the bacteria alive. The presence of the bacteria stimulates the production of specific antibodies which destroy the bacteria and increase resistance to the infection.

In certain individuals the germs, usually streptococcus, pneumococcus or staphylococcus, are carried by the blood stream or

lymph vessels to other organs or tissues of the body setting up systemic diseases. Or the bacteria at the focus of infection may produce poisonous substances or toxins which are carried to other parts of the body, producing harmful effects. Exhaustion, under-nourishment, age, the number and virulence of the germs and local conditions at the focus of infection are all factors in producing acute and chronic systemic diseases. That a local tooth infection may cause diseases was recognized by Dr. Benjamin Rush, one of the signers of the Declaration of Independence, when he reported a case of rheumatism which he cured by the extraction of a diseased tooth. He saw over one hundred years ago the relation of dental infection to diseases.

It seems that germs growing in certain foci in the body, such as the teeth and tonsils, may develop an elective affinity for certain tissues or organs of the body, so that when they are isolated and injected into animals they will still localize in certain parts of the body, as the joints, heart valves, appendix, muscle, kidneys, etc. Often the germs will produce lesions in the organs or tissues from which they were obtained, when they are injected into experimental animals.

These pathogenic bacteria must find a focus of diseased tissue to remain in the oral cavity for any length of time. Otherwise foreign bacteria are promptly removed by mechanical flushing of the mucous surfaces. Bacteria introduced into the nose and mouth do not colonize and grow there indefinitely. The normal surfaces of the upper air passages are unfavorable to foreign bacteria, pathogenic or non-pathogenic. They persist only in foci of diseased tissue. In these focal infections they multiply, and are discharged either into the blood stream and lymphatics, or as in germ carriers, into the secretions of the mouth and nose, spreading the disease to others (diphtheria, meningitis, pneumonia, hemolytic streptococcus infections). Foci of diseased tissue in tonsils, adenoids, nasal passages, gums or at the roots of teeth are the chief breeding places for disease-producing bacteria found in the mouth. Normally the mouth contains non-pathogenic bacteria (non-hemolytic streptococci, gram-negative cocci, diphtheroids, etc.) The presence of others indicates a focus of diseased tissue, an infectious disease, or accidental and temporary introduction of disease-producing bacteria.

One of the most common effects of oral infection is anemia. This disease is characterized by a reduction in the number of red blood cells, or the amount of coloring matter or hemoglobin. There may be increased blood destruction or decreased blood formation. Striking results are often obtained by removal of oral infections in these cases. The blood picture returns to normal, the patient's resistance is increased, the weakness and pallor disappear. Some

clinicians believe that infections of the teeth and tonsils may be responsible for a serious, usually fatal, form of anemia called primary or pernicious anemia. It is possible that an infectious agent at present unknown, enters the body in this way. Removal of mouth infections, especially in teeth and tonsils often causes improvement in the condition of the patient.

One of the most important diseases of the circulatory system is infectious endocarditis or valvular diseases. It is always a secondary infection from some primary focus in the tonsils, adenoids, etc. In children the usual course of events is that well-known tetrad, tonsillitis, rheumatic arthritis, endocarditis and chorea. The endocarditis results often in chronic valvular diseases. In adults infectious endocarditis is often caused by streptococcus viridans following tonsillitis or periapical granuloma. This type is usually fatal. In other cases the hemolytic streptococcus or pneumococcus are found. Pericarditis or myocarditis may also follow tooth infection. In other cases cardiac irregularities or arrhythmias may follow pyorrhoea alveolaris or periapical granuloma. Removal of the infection often causes disappearance of the symptoms.

Arteriosclerosis and hypertension or high blood pressure are undoubtedly aggravated by focal infections, perhaps even caused by them. In practically all such cases post-mortem examinations will reveal a septic rheumatic process, or focal infection with the streptococcus. Dr. Ophuis has recently found in a series of 500 necropsies that in those cases in which all history or signs of previous infection were absent chronic arterial disease was almost entirely absent, but appeared early and frequently in the group with chronic rheumatic (septic) conditions. Not only did the septic group include nearly all cases of chronic arterial disease, but also all cases of hypertension and of nephritis in which there was a sufficient history.

Arterial sclerosis and high blood pressure, then, are due in most cases to focal septic infections with streptococcus, or the action of some toxic bacterial substance, which may cause either or both of these conditions. It is therefore important to discover the focal infection as early in life as possible and remove it. After the infection has existed for some time even its removal may not stop the progress of the cardio-vascular diseases.

DISEASES OF THE KIDNEYS

The view that the various types of degenerative, inflammatory and arteriosclerotic kidney disease are due to infection is rapidly gaining support. Careful studies of large groups of cases indicate the importance of a focal infection, often streptococcus, as a cause of the disease. In childhood nephritis usually follows scarlet fever, tonsillitis, erysipelas, endocarditis, rheumatic fever or chorea, in all of which the streptococcus plays an important part. In adults it

often follows tooth infection. The removal of recognized foci of infection as early as possible would do much to reduce the number of cases of nephritis. After the foci have been present for years, with secondary foci of infection in the kidneys, the removal of the primary focus may be of little value.

DISEASES OF THE GASTRO-INTESTINAL TRACT

People with pyorrhea alveolaris or periapical granuloma frequently complain of digestive disorders, due either to bacterial contamination of the food, insufficient mastication of the food or nervous disorders. Removal of the infection is often followed by disappearance of the symptoms.

That ulcers of the stomach or intestines may be due to bacteria carried by the blood from infected teeth or tonsils is not unlikely. In these ulcers streptococci resembling those seen in periodontal abscesses or infected tonsils can usually be found.

Acute appendicitis may follow a focal infection in the teeth, tonsils, nasal sinuses and elsewhere. Here also the infection is hematogenous. The bacteria locate in the appendix causing an acute or subacute inflammation. The same is true of some cases of gall bladder infections or cholecystitis, due to streptococcus or other bacteria.

DISEASES OF BONES AND MUSCLES

A large per cent. of cases of infectious arthritis is due to streptococci from infected teeth or tonsils. The germs are transported by the blood to the joints and acute or chronic arthritis follows. Hypertrophic osteoarthritis or arthritis deformans is most often due to infected teeth. In these cases streptococci can be demonstrated in the joints as well as the periapical granuloma. Osteomyelitis or infection of the bone tissue with abscess formation may also occur. This disease often follows an injury, after which emboli of germs localize in the weakened area producing bone destruction.

In childhood, arthritis usually follows infection of tonsils and adenoids; in adults periapical infections of the teeth are the chief cause. The acute rheumatic fever is a streptococcus infection almost always following tonsillitis. Removal of focal infections will often be followed by rapid disappearance of the arthritis.

Sometimes more than one focal infection may exist. In the more chronic cases, such as arthritis deformans, the best that we can expect to do is to stop the progress of the disease. Vaccine therapy and surgery may be necessary in certain cases.

Cases of myositis or acute muscular rheumatism may clear up rapidly on removal of infected teeth or tonsils or other focus. In these cases streptococci localize in the muscles causing the pain and other symptoms. Erythema nodosum, characterized by skin lesions may accompany arthritis and is also a streptococcus infection from some focus.

DISEASES OF NERVOUS SYSTEM

Oral sepsis may be the primary cause of a number of diseases of the nervous system, such as multiple neuritis, neuralgia of various kinds and neurasthenia. These patients are often greatly benefited or completely cured by removal of infected teeth or treatment of the pyorrhea. In some cases of sciatica or even trigeminal neuralgia oral sepsis is the cause. Recurring iritis not of syphilitic origin is often due to focal infection the removal of which results in disappearance of the eye infection.

DISEASES OF METABOLISM

In cases of diabetes, a disease characterized by disturbance of carbohydrate metabolism, of which there are said to be one-half million cases in this country, the tolerance for sugar may be increased after removal of oral infection. The condition of the mouth should always be studied. This disease could be controlled largely by avoiding overeating and obesity, especially by those people whose parents are diabetics. Proper diet and oral prophylaxis would greatly reduce the number of cases of this often serious disease.

Diseases of the thyroid gland, such as exophthalmic goiter, are often greatly benefited by removal of infected teeth and tonsils. The infection and toxemia seem to stimulate the thyroid to excessive activity. Removal of any focal infections is an important part of the treatment of this disease.

SUMMARY AND CONCLUSIONS

I have called your attention to the importance of focal infections in the production of systemic diseases, with special reference to oral sepsis. My object has been to emphasize the need for close cooperation between the physician and dentist, bacteriologist and radiologist, in the prevention and proper treatment of focal infections of the oral cavity, and their sequelae. We must ever keep in mind the best interests of the patients, and protect them from ruthless extraction of all teeth open to the slightest suspicion or inadequate treatment of tooth infection. The dentist must recognize the importance of oral sepsis in causing systemic disease, and remove foci of infection, and the physician must advise expert dental examination and treatment whenever necessary.

In closing I wish to make a plea for the dissemination by every possible agency of knowledge regarding mouth hygiene. The mouth is the great portal of entry of bacteria into the body and must be kept clean to function normally. Oral sepsis causes contamination of all foods swallowed and in addition many systemic diseases. The teeth must be sound and properly formed to enable the jaws, face and skull to develop normally. Tooth decay is due largely to denaturized foods and failure to cleanse the teeth properly. The result is bacterial invasion and decay. Lack of sufficient use of the jaw in feeding has caused it to recede, and, instead of the protrud-

ing jaw of prehistoric man with plenty of space for all the teeth, we now have jaws in which the last molars and wisdom teeth are almost crowded out, and hence cannot be kept clean.

The welfare of every man, woman and child is inseparably linked with the condition of the mouth and teeth. I have shown you that foci of infection which act as the breeding places for bacteria and disseminate them, are always located in diseased tissue. A healthy mouth does not permit such growth and spread of bacteria. Dentistry has done wonderful work in the repair of diseased teeth, but more than this is necessary to reduce mouth infections.

First, the child must be born of healthy parents, free from disease. Second, it must have a properly balanced diet containing all the food substances necessary for growth and development. Third, it must avoid all foods which cause tooth decay, and destroy the teeth. Fourth, the teeth must be cleansed periodically to free them from bacterial plaques which start decay. (The tooth problem is closely connected with our food habits, which are difficult to change.) Fifth, diseased tonsils and adenoids should be removed as early as possible to permit proper development of the jaws, face and skull, as well as the mentality of the child. Sixth, teeth with apical infections or granulomas, should be extracted after careful dental and X-ray examination. Pyorrhea should receive the proper treatment. Seventh, any acute or chronic focal infections anywhere in the body should be removed as early as possible. Eight, the natural defenses of the body should be increased by hygienic living, fresh air, sunshine, proper food, tonics and vaccines whenever indicated.

The dentist and physician have an opportunity of rendering a service to mankind, than which there is none greater, the prolongation and betterment of human life.

"Not myself, but the truth that in life
I have spoken.
Not myself, but the seed that in life
I have sown
Shall pass into ages—all about me forgotten
Save the truth I have spoken, the things I have done."

DENTAL WORK AS A PROPHYLACTIC MEASURE IN IMPROVING THE PHYSICAL CONDITION OF EMPLOYEES*

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THE relation of dental defects to systemic conditions has been very thoroughly investigated and written about during the past few years. As is usual with the advent of new ideas, two schools of thought were quickly developed.

One school advocated extremely radical procedures, such as the ruthless extraction of all dental organs open to the slightest suspicion; the other school, ultra conservative, refused to accept the evidence shown by the remarkable restoration to health of many persons, after dental infection had been removed.

We must not allow the battle smoke of this hotly contested controversy regarding dental infection to blind us to the more important consideration of the part played in health or illness by unclean and unsanitary mouths.

It should be obvious to all that if pure water and clean wholesome food are really important factors for health, it is highly desirable to maintain the purity of the water and the wholesomeness of the food until it reaches the digestive apparatus of the individual, where it will be changed into a form that will be assimilated easily and thus sustain life and health.

It is here that the importance of mouth hygiene comes in. Of what avail is it to put pure wholesome food into a mouth filled with the decomposing debris of previous meals—of a mouth with diseased or broken-down teeth?

Should it be surprising, then, that a procedure which brings a continued clean and hygienic condition of the mouth should result in an improved physical well-being?

Careful and scientific investigation by Professor Gies, and Professor Kligler of Columbia University, shows that there is a reduction in number of at least 495 million bacteria per mm. in a fairly clean mouth as compared with a dirty one. This did not take into consideration a clean mouth.

It is safe to say the bacteria found in a clean mouth are practically harmless, while the bacteria that grow and multiply in a dirty mouth become virulent and dangerous. The long continued presence of bacterial masses in and around the teeth bring about inflammation of the gum tissues. Normal, healthy gums are practically impervious to bacterial invasion. But inflamed gums become

*Read Before the Industrial Hygiene Section of the American Public Health Association at the Fifteenth Annual Meeting, New York City, November 18, 1921.

open gateways for the entrance of harmful bacterial life into the blood-stream of the body. Professor Jordan in "General Bacteriology" says:

"The portal by which bacteria gain entrance to the human body is of great importance in determining whether or not disease shall occur. Typhoid bacilli rubbed into the abraded skin may give rise to no reaction of importance, while the same microorganisms, if swallowed, may cause fatal infection. Conversely, virulent streptococci, when swallowed, may cause no harmful effects, while the same bacteria rubbed into the skin may give rise to a severe reaction."

The question of gum condition is therefore of great importance, as the human mouth always contains a large number of streptococci, and streptococcus infection is made possible when the soft tissues of the mouth become badly inflamed.

Periodical prophylactic dental treatment must necessarily include X-ray examination, for it is only by the aid of the X-ray that we are enabled to ascertain the presence of abnormal conditions surrounding the roots of teeth.

In the Metropolitan Life Insurance Company's dental clinic, two cleansings of the mouth are given each year and X-ray examinations made of all teeth having crowns, bridges, or teeth with non-vital pulps. The work has been continued for a sufficient time to show certain results. Those who have come regularly twice a year since 1915 have the highest per cent. of clean mouths and the lowest per cent. of unclean mouths. Furthermore, the percentage of clean mouths has increased year by year and the percentage of unclean mouths has decreased year by year. This is true of all classes.

The classes have been designated as follows: Those who started in 1915 and have continued to come twice each year are called "Class 1." Those who started in 1916, "Class 2," etc. The following table* has been published, but I present it at this time to illustrate this important fact.

Taking the figures of Professor Gies and Professor Kligler showing the reduction in the number of bacteria in fairly clean mouths as compared with unclean mouths, we shall readily see that there probably has been a very great reduction in the number of bacteria in the mouths of the employees examined at the Metropolitan Life Insurance Company's clinic. This fact may be accountable for the following rule issued by the president of the Company in 1919, making dental examination a requirement:

"The services rendered by the dental division since its establishment in 1915 have been so curative of impaired health conditions, and so permanently helpful to the employees who have taken advantage of the opportunities offered, that henceforth every home office employee will be required to undergo examination and cleansing of

the teeth in the home office dental division twice a year. If the service of the family dentist is desired rather than that of the home office dentist, such examination and cleansings by him will be accepted, but they must be procured without expense to the Company and the employee must furnish a satisfactory certificate from him that the required work has been done."

(Signed) Haley Fiske,
President.

The X-ray examination has likewise greatly helped in the improvement of the health and efficiency of the employees.

While we have not as yet had the opportunity to work this out upon a large scale, the results obtained in several cases may prove of value to those interested in welfare work.

	YES			NO			FAIR		
	1918	1919	1920	1918	1919	1920	1918	1919	1920
Class 1 started in 1915.....	27%	33%	39%	25%	9%	6%	48%	58%	55%
Class 2 started in 1916.....	25	33	43	27	9	7	48	58	55
Class 3 started in 1917.....	18	35	42	29	9	6	53	56	52
Class 4 started in 1918.....	10	27	40	50	14	9	40	59	55
Class 5 started in 1919.....		21	33		27	12		52	55
Class 6 started in 1920.....			13			31			56

Case 1. A man, forty-two years of age, suffered from anemia. Spent one year at the Company's sanatorium. No improvement. In April, 1916, two infected teeth were extracted and in April, 1917, one infected tooth was extracted. From that time on he had no further trouble. In fact in June, 1917, he entered the United States Army and came through with flying colors.

Case 2. A woman, forty-four years of age, suffered from neuritis, headaches, rheumatism and infected teeth. She lost eight weeks from work in the summer of 1916. In June four infected teeth were extracted and she has had no trouble since.

Case 3. A man, fifty-two years of age, suffered attacks of pain like gall stones or gall bladder inflammation. In October, 1917, twenty-one infected teeth were extracted and since then he has had no return of the attacks.

Case 4. A woman, twenty-nine years of age, suffered from headaches, neuralgia for years, colds, fatigue, poor appetite, insomnia, loss of weight and infected teeth. She spent one year at the Company's sanatorium and made slow improvement. In January, 1917, seventeen teeth were extracted and antrum curetted. From that time she gained rapidly in health and is now an unusually healthy young woman.

Case 5. A woman, forty-seven years old, suffered from neuritis, palsy, tuberculosis and infected teeth. During 1916 she lost

forty-one weeks from work. In March, 1917, she had seven teeth extracted. Since then the attacks of neuritis have been relieved.

Case 6. A man, fifty-eight years of age, suffered from lumbago, rheumatism and bad teeth. In 1916 he lost twelve weeks from work. In June, 1916, he had pyorrhea treatment and the root canals of devital teeth were filled. All the conditions are better.

Case 7. A man aged forty-one suffered from neuritis, grippe, loss of appetite and bad teeth. He lost five weeks from work in 1917 and one week in 1919. In September, 1917, the infected teeth and roots were extracted and all symptoms of neuritis disappeared and his appetite improved.

Case 8. A young woman suffered from blurring of vision of her left eye. No cause was found in the eye itself. Two badly decayed teeth and two infected teeth were extracted during November, 1918. Two granulomas found and both buccal roots opened directly into the antrum. By January 8, 1919, the trouble had all cleared up.

Some other interesting figures secured in connection with X-ray work are the following:

One thousand charts of cases where there were no teeth with non-vital pulps, were picked out at random, no attention being paid to the medical records. The same number were picked out among those who did have one or more teeth with non-vital pulps and which showed radiographic indication of a changed condition about root ends. While the number is too small to deduce any dogmatic conclusions, the increase of systemic disturbances is sufficiently large to indicate that dental conditions are important factors to be considered in all health work.

There is one symptom that has not been recorded, and which should be recorded in all future figures of this nature. We find that while some employees may suffer from headache, and others not, fatigue is almost always present in every case.

	Patients without Dental Infection	Patients with Dental Infection	Shows % In- crease
Neuralgia	3.8	8.3	18.4
Headache	1.9	3.2	68.4
Nervousness	1.7	4.5	64.7
Colds and nasal fossa	19.8	23.6	19.2
Furuncles.....	2.4	4.5	87.5
Abscess and skin trouble	2.6	4.5	73.1

In conclusion permit me to say that in my opinion no welfare work for industrial employees is complete nor can it be fully efficient which does not include regular and periodical prophylactic dental treatment, and I base my opinion upon the reasons and figures given in this paper.

FILLING PULP CANALS BY DIFFUSION
DOTS ON OPENING CANALS
IONIZATION WITH CHURCHILL'S TINCTURE OF IODIN*

BY HARRY B. JOHNSON, D.D.S., ATLANTA, GA.

I AM THANKFUL that a paper of this kind is no longer necessary to stress the importance of filling the main or trunk canal. It is still important, however, to stress the importance of filling the accessory canals, for each of these smaller canals, if unfilled, constitutes as great a menace to the health of the tooth and the patient as the trunk canal.

It is a fact that the very great majority of tooth roots have more than one canal and foramen, and it is my opinion that failure to fill these accessory canals and seal their foramina has been the cause of failure of those teeth which the X-ray shows perfectly (?) filled; but you say that it is impossible to fill these with any degree of certainty. You don't know where they are—the X-ray doesn't show them, and how can we fill a canal when you don't even know if it is there or not? By the old Chloro-percha method I grant you it is impossible, but by the improved methods I contend that it is not only possible but easy to fill any number of accessory canals of any shape, size or direction, whether you know they are there or not. I will endeavor to prove this by X-rays of fillings made in the mouth, and slides of decalcified teeth filled out of the mouth.

Before going into this part of the paper, however, let us get straight on some of the principles upon which we cannot rely for accomplishing this purpose. The oldest method upon which we have pinned our faith and been totally disappointed, is that involving force. It is a physical impossibility to fill these minute canaliculi by force without exerting such a great amount that it would split the tooth. This method assures us too of too great an excess of filling material beyond the foramen.

Next, Dr. Callahan brought out his method which we might say involves persuasion. This is the most effective method evolved up to date for filling the trunk canal, but it is entirely futile for the accessory canals, except with certain modifications, which will be outlined later.

Next, Dr. Howe, of Boston, brought out his method of filling them by capillary attraction, but by a long series of experiments I finally succeeded in proving what any one should know after a moment's thought—that capillary attraction does not exist in the

*Read before the North Carolina State Dental Society, 1921.

root canal of a tooth in the mouth. The smallest ends of the capillaries are closed by the periapical tissues, and it is a well-known fact that when the end of a capillary is sealed even by placing therein the most minute quantity of water, or other substance, the entire attractive force of the capillary is neutralized. I do not contend that Dr. Howe's solutions do not penetrate the canals, canaliculi and tubuli, but they do not do it by capillary attraction, but rather by diffusion.

How may we render these minute canaliculi receptive to our filling materials? By man-made methods, or by utilizing the forces of nature? Man's chief function here on earth is to discover and utilize the laws created by Him who created us. "Laws of Nature," so called, is but one division of God's laws, and the most successful practitioner of the healing and restorative arts is the one who can most fully utilize the forces created by God in nature. *Nature has stored away in each pulp canal a force exactly sufficient to fill it perfectly if we can perfectly utilize that force.* This force is known as "The law of diffusion of liquids," which is in effect that two or more liquids capable of being mixed will when placed together effect a spontaneous exchange of molecules, even in defiance of the law of gravity, until each has become perfectly diffused throughout the other.

How may we best utilize this law in the filling of pulp canals? I do not know the best way—that is yet to be found, I think, but I do know one way which has in my hands given remarkable results. This is by certain additions and modifications to the Callahan Method, which will give in the hands of a skilled operator results which we have not heretofore considered possible.

Briefly stated, the Callahan Method consists of the use of dilute sulphuric acid as a decalcifying medium to assist in opening the canals, followed by a saturate solution of sodium bicarbonate, causing a rapid effervescence which effectively clears out all debris. The acid is also a powerful though superficial germicide. After dehydration the canal is flooded with a solution of chloroform and fiddle-bow resin in the proportion of twelve grains of resin to three fluid drams of chloroform. A point of pure base gutta-percha, only slightly smaller in diameter, but longer than the canal, is then selected, passed into the canal and caused to dissolve in the chloroform by a rapid though delicate pumping or stirring motion. We will now take up this technic at the first step after the tooth has been prepared for treatment, and follow it through, step by step, in the proper sequence. The first and most important thing is to cleanse as thoroughly as possible the trunk and accessory canals of all organic material, and leave them clear so that they can be properly and perfectly filled in the last step of this technic.

SULPHURIC ACID AS A CLEANSING AGENT

For this purpose 30 to 40 per cent. aqueous solution of the chemically pure acid is used. This softens the wall of the canal by a process of decalcification so as to permit easy and fairly rapid enlargement of its caliber by curetting with various instruments. The most valuable factor in the use of the acid, however, is that it may safely be sealed in the canal, thereby giving it time to diffuse through accessory canals which cannot be reached with any instrument and can be treated *only by grace of the law of diffusion of liquids*. It must always be borne in mind that our real problem is to fill these accessory canals and seal their foramina. By diffusion, the sulphuric acid will penetrate these more safely than any other chemical now at our disposal. It is far from being as effective in dissolving the organic content of these canaliculi as we would like, but so far the prime factor of safety to the patient has prevented the sealing in of any more effective solvent; for bear in mind that these canaliculi can be reached *only by diffusion*, which requires time. The organic matter in the canals and canaliculi is attacked to a marked degree, caused to yield up its water, shrink and release its hold upon the tube wall. The effervescence caused by the addition of soda will then break it up and remove it cleanly from the larger canals and to a considerable extent from the smaller canaliculi. But although the organic matter is not perfectly removed from these, part of that remaining is forced out of the foramina into the tissues where it is promptly digested and the remainder encapsulated in the filling.

The advantages of the dilute sulphuric acid then appear to be as follows: (1) It permits of the rapid and perfect cleaning and enlarging of the main canal. (2) Its marked affinity for water causes its diffusion through all the accessory canals where its well known oxidizing properties have a burning or charring effect upon the dead tissue. (3) the addition of soda produces such a violent effervescence that not only this debris but frequently even broken instrument points will be forced out by it. (4) Last but by no means least, it may be safely sealed in the tooth, which will allow ample time for this diffusion through all canals and canaliculi, enlarging them by a self-limiting decalcification and cleaning and sterilizing by oxidation.

What about the possibility of pumping some of this sulphuric acid through the foramen? With reasonable care this result would be the very great exception; for bear in mind that any liquid you place in the canal does not go ahead of the instrument, but follows it (40 per cent. sulphuric acid is a heavy liquid), and you are much more liable to get a laceration of the periapical tissue from your instrument point than an irritation from the acid. In a root having a large foramen you have only slight need for the acid, and it,

like any other similar agent, must be cautiously and sparingly used in this type canal. It should not and need not be sealed in a canal of this kind.

TECHNIC AND INSTRUMENTATION

After the canal has been freed of pulp tissue, or old filling, the crown of the tooth is coated with cavity varnish, sandarac, or chloro-resin, the pulp chamber flooded with 40 per cent. acid and the canal entered with a fine or extra fine Kerr pulp canal file. This is gently passed in until it hangs. It is then given about one-eighth twist, held in that position and withdrawn. This is repeated, pumping the acid in thoroughly until the instrument and acid have penetrated to about the apical third or has gone as far as it will easily go. The next smaller sized file is then used and the opening and pumping continued slightly farther. Measuring wires may be used at this point if desired. No instrument larger than the finest smooth broach, or pathfinder, should ever be passed through the foramen if it can be avoided. In the majority of cases it is easy to tell when you are about to enter the foramen, as there is a slight constriction just short of the actual opening. The acid should be thoroughly pumped to this point and neither acid nor instrument carried any farther. It is *difficult* to coax the acid to this point and there is small danger of getting it any farther, except, of course, in the very large canals. The acid is neutralized at frequent intervals, removing the debris, and just before sealing the cavity and dismissing the patient, fresh acid is pumped into the canal, and the surplus absorbed out of the pulp chamber, a pellet of sterile cotton placed in, and the cavity sealed with *hot* temporary stopping *without pressure*. This may be left in for any length of time that may be desired or necessary, as the acid is self-limiting in its action, and, due to the alkalinity of the lime salts of the dentin, does not remain active for more than two or three hours.

If the canal in which you are working is not perfectly straight and your Kerr file hangs at some point, or suddenly fails to penetrate farther, remove it from the canal, and with your radiograph as a guide, bend the *point* of the file slightly, reintroduce it into the canal, and *probe* for the opening into the remainder of the canal. The very great majority of canals can be freely and easily opened if we can bend our file to approximate the curve in the canal. Force plays no part in the opening of a pulp canal—it must be done by “persuasion.”

Let us study for a few moments just what the acid does while it is in the canal and how it does it. In a pulpless tooth all of the canals and canaliculi are as a rule filled with decomposed organic matter in aqueous solution. That can be removed from the main canal by absorption, but it cannot be removed from the fine accessory canals. When the main canal is flooded with acid then the

law of diffusion of liquids comes to our help, and as the 60 per cent. of water contained in the acid solution is not sufficient to satisfy the acid, it takes up more water from whatever source it can gather it. Sealed in the tooth, its only available supply is contained in the accessory canals and to some extent in the tubuli. It can gather but little from the tubuli, however, because of the wall of calcium sulphate which it quickly builds up around itself and which prevents its further penetration. It must, therefore, act upon the watery content of the accessory canal, which it promptly does. The water in these canals is drawn into the acid and the acid flows back into the canals. In other words, sufficient of the water and the acid change places to produce a balancing of the solution. Does any of this acid diffuse into tissues beyond the foramen? Not unless the apical tissue has been broken down and replaced with cystic fluid. Its action in coagulating albumen will not permit it to actually enter living tissue. There again it is self-limiting. It must have a fluid medium and finding such in the accessory canals, it follows them to the ends, oxidizes and breaks up the dead tissues contained in them, and destroys the bacteria. In treating the canal it is not possible to ascertain where these accessory canals are, their number nor direction; but if they are present (and we are told by excellent authorities that they always are) the acid will find them.

Subsequent application of fresh acid followed by the soda will result in the complete removal of all organic material from all of these canals excepting those exceedingly small and quite longer than the average.

FILLING THE CANALICULI BY DIFFUSION

When we have finished with our acid and neutralized it for the last time, our canaliculi are filled with water, holding many chemical compounds in solution. The water effectively bars the entrance of chloro-resin solution, so we must substitute something else for this water, something which has affinity for chloroform. Alcohol is ideal for this purpose. The main canal is then flooded with 95 per cent. alcohol, which is thoroughly pumped and churned into it. By diffusion this substitutes for the water in the canaliculi, filling them with lower grade alcohol. Ample time must be allowed for this, for if the canaliculi contain less than 85 per cent. alcohol, the chloro-resin will not diffuse through them. This usually requires from two to three minutes. All of the alcohol which can be removed with absorbent points is then taken out and the pulp chamber and canal flooded with chloro-resin. *No pulp canal driers or hot air must be used at this stage*, for we wish the canaliculi to remain filled with alcohol. The chloroform diffuses perfectly and fairly rapidly in the alcohol, and inasmuch as the resin is in perfect solution in the chloroform, wherever the chloroform goes the resin

goes. Time is required here also. It is not a "slam-bang" process. Allow from three to five minutes here, pumping in fresh chloro-resin as the chloroform is soaked up by the tubuli and canaliculi or passes off by evaporation. Toward the end of this period, when the solution in the canal begins to get rather heavy, add pure chloroform as needed to keep it sufficiently thin to dissolve the gutta-percha point.

When this third substitution or diffusion is complete, a gutta-percha point of suitable size and shape is then passed into the canal and dissolved by either a pumping or stirring movement, which movement you use is governed by the size of the foramen. With a normal, small foramen; a pumping movement is best; with a large foramen this would force too much chloro-percha through, therefore a stirring movement is used.

Just how beautifully the gutta percha will diffuse through the chloroform is shown by the illustrations of decalcified teeth and the radiographs of teeth filled in the mouth.

We are told, and correctly I think, that chloro-percha in hardening shrinks from the periphery. In other words, it releases the walls of its container. And we are also told that chloro-resin-percha in hardening shrinks from the center, or clings to the wall of its container by virtue of the strong adhesion of the resin and the fact that tiny threads of this material actually enter the tubuli. An excellent way to assist this central shrinkage and peripheral adhesion is as follows: After the filling has been sufficiently condensed with the canal pluggers, select a very small plugger, and by passing it down through the center of the filling for at least half the length of the canal entirely break up all central cohesion.

The pulp chamber should then be quickly filled with cement so as to prevent external evaporation of the chloroform, for if the chloroform is permitted to evaporate externally, even the above precaution will not prevent peripheral shrinkage.

Nothing has been said so far about the effectiveness of the resin in filling the tubuli. Chloroform is one of the most penetrating liquids we have, and it not only quickly penetrates the tubuli but the inter-prismatic spaces between the enamel rods as well. This can be easily proved. Dehydrate an extracted tooth, allowing it to dry out or by a protracted immersion in alcohol or acetone, soak it for several hours in a rather heavy chloro-resin solution, then try to break the enamel with a chisel or by grinding with a coarse stone. An old tooth which has been dried out for years, and the enamel of which is as brittle as glass, can be made as tough as a fresh tooth in a very few hours by this simple process. This is an excellent way to treat your technic teeth so as to prevent the chipping off of the enamel while you are preparing them for various uses and also to prevent their cracking and checking in after years.

Of course if this solution will carry sufficient resin into the inter-prismatic spaces to have this effect on old, dried-out teeth, there can be no argument about it carrying sufficient resin into the infinitely larger tubuli to effectually obliterate them and encapsulate in its dense, solid substance any bacteria they contain. Even granting (as some contend) that the resin is not a germicide or antiseptic, a bacterium encapsulated in it must remain inert until it dies of old age.

PART II

A DEFINITE TREATMENT OF PERIAPICAL INFECTION

For several years I have consistently used ionization immediately before filling the canals of all infected teeth, and even the old zinc chlorid has given some remarkable results. But for the past year I have been using a solution of iodine for this purpose which has given results far exceeding anything I have ever been able to get before. This solution is simply the old time Churchill's tincture of iodine. It is highly electrolytic and has a high iodine content—19 per cent. I now have records of over 100 cases of periapical abscesses with sinus (or fistula), and in every case save three, the formation of pus ceased immediately after fifteen minutes ionization with this solution. In the great majority of these cases the canals were cleaned out, ionized, and filled at the first sitting, and in no case except the three mentioned was there any after-soreness or discomfort to the patient.

Case 1.—Girl, age thirteen; right lower first molar; abundant flow of pus from both roots persisting for over three months in spite of treatment by several good dentists. Could not be sealed for more than an hour. Ionization with zinc chlorid gave no results.

Treatment.—Pus removed with dioxigen, Churchill's tincture of iodine pumped into the canals, zinc point placed in each canal and all of them ionized at the same time. Current for fifteen minutes, giving one-half milliamperes for each canal or a total of one and one-half milliamperes. The pulp canals were then filled immediately by the modified Callahan Method. The following day when the patient returned, she reported that there had been absolutely no pain and the tooth perfectly comfortable at all times and capable of mastication.

Case 2.—Boy, age fourteen. History showed an acute abscess four months previously on left lower first molar. No treatment given at that time. Copious flow of thin, light yellow pus. Treatment and result identical with case No. 1.

Case 14.—(Cited because it is the worst case of this type I have ever treated.)—Woman, age about twenty-five; upper right bicuspid, very ugly sinus of five months standing, on the buccal gum. Treatment same as other two cases quoted, except, as this tooth has only two canals, it was given a total of only one milliamperes. Twenty-

four hours later the sinus was entirely closed, only a white cicatrix remaining. No after-pain or soreness. (Most of the sinuses close in twenty-four hours.)

Case 39—Boy, age eighteen; upper right first molar; condition exceptionally foul; small quantity of pus of the heavy, viscid type. Treatment the same as previous cases. Patient returned in afternoon of the same day, suffering acutely. Tooth was extracted, and in the mesiobuccal socket was found a large opening in the antral floor. (Radiograph is often deceptive in regard to this.)

Case 41.—Lower right bicuspid; putrescent. Treatment as above. Result: Entire relief of pain and no after soreness whatever.

Up to this date a total of over 100 cases have been treated as outlined above, and in all but three of that number the flow of pus and formation of gas have been stopped successfully, leaving the tooth entirely comfortable and immediately serviceable.

Now before closing let me state what I believe will eventually be the perfect pulp canal filling. It will be made by some solutions which depend absolutely upon diffusion for carrying them throughout the tooth structure and avoiding the necessity of even the slight force which is used in pumping the gutta-percha point after the Callahan Method. It is my dream that some day some dental chemist may devise a method and solutions which, when carried into the canals and canaliculi by the simple force of diffusion, may then be converted into a non-irritating, non-shrinking, non-absorbent, insoluble, and adhesive solid. May the day of this discovery be not far distant, and you are all invited and urged to get in this race with me and see if you cannot beat me to the tape.

NITROUS OXID-OXYGEN ANESTHESIA FOR DENTISTRY
AND ITS STANDARDIZED INDUCTION*

BY J. A. HIEDBRINK, D.D.S., MINNEAPOLIS, MINN.

FOR CONVENIENCE, I will divide nitrous oxid-oxygen administration into two periods—*first*, the induction period which includes establishing and stabilizing anesthesia; *second*, the carrying period, which applies to the maintenance of anesthesia once established.

The manner of inducing anesthesia with nitrous oxid-oxygen is of great importance, more especially when administered for dentistry. In dentistry the mouth remains open during the operation, and complete control over what the patient breathes is lost. Mouth and throat packs assist but cannot be depended upon to exclude all air. Therefore, it is essential that anesthesia be well established and stabilized before operation begins, so that anesthesia may be more evenly maintained throughout the carrying period.

INDUCTION

Nitrous oxid-oxygen anesthesia induction should be sufficiently slow to allow time for the nitrous oxid to be taken up by the blood and carried throughout its circulation. This distribution is necessary to well establish anesthesia.

By administering pure nitrous oxid to the normal adult, a questionable anesthesia may be induced in approximately fifty seconds, less time than is required for the blood to absorb the nitrous oxid and complete one cycle. The undesirable results of this form of anesthesia induction (in order of their appearance) are:

1. Undue and unnecessary excitement, probably due to the feeling of suffocation resulting from a too sudden removal of oxygen from the blood stream.

2. Exaggerated symptoms precede or appear simultaneously with anesthetization.

3. Symptoms develop rapidly and are overlapping. Therefore it is difficult, if at all possible, to follow accurately the different stages of anesthesia.

4. The desired plane for operation reached, it is difficult to arrest the momentum of the anesthetic until far into deeper stages where undesirable, unduly pronounced symptoms appear, requiring that anesthesia must then be lightened, and an attempt made to stop at the proper plane for the operation to proceed. This unevenness

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of anesthesia is conducive to shock. Nausea and depression are likely to follow.

5. Anesthesia is poorly established, therefore is difficult to maintain on an even plane. It is readily dissipated by a breath of air or oxygen. There is no assurance that the patient will not be cognizant of pain, if operated upon.

The above evils are reduced to the minimum, or entirely overcome by slow induction, which is accomplished by admixture of oxygen in the beginning.

There is some latitude for difference of opinion as to where lies the balance between too rapid and too slow induction. In determining this for myself, I sought the induction comfortable to the patient that would produce a reasonably well-established anesthesia in the shortest time practicable.

In comparing results from administering nitrous oxid-oxygen in various proportions to approximately five thousand cases, it was necessary that the induction be timed. In this manner the discovery was made that normal individuals were quite uniform in susceptibility to nitrous oxid-oxygen anesthesia. With a given mixture, practically all normal patients reached approximately the same stage of anesthesia in the same length of time. Then came the deduction: Why not time all inductions to insure uniform administration of the selected anesthetic mixture or dosage?

Seemingly, the most satisfactory results were obtained by administering 93% nitrous oxid and 7% oxygen for one minute, followed by pure nitrous oxid until the desired stage of anesthesia was reached. This period of pure nitrous oxid administration was found to be quite uniformly forty seconds for normal adults. Then oxygen was again added in sufficient quantity to maintain anesthesia on an even plane while operation proceeded. I found that in a large majority of cases 7% of oxygen (plus the air breathed during operation) was the amount required. Changes in mixture were made when indicated. (The above favored mixture of 93 and 7 is the same as previously reported by me to be 95 and 5. An error in measuring was discovered by recently-procured accurate means for metering the gases as they flow from the apparatus.)

This technic has been verified by many thousand administrations covering the three or four years past. The slow induction is recommended for the following reasons:

1. With oxygen supplied to the patient, there is no suffocation during the first minute. At the end of that time anesthesia will have progressed sufficiently that little or no feeling of suffocation will result from the removal of oxygen during the remainder of the induction. Therefore, the patient will be quite comfortable and excitement reduced to the minimum; usually none is apparent in normal cases.

2. Symptoms are mild as compared to those of pure nitrous oxid induction.

3. Symptoms develop more slowly and can be more accurately interpreted. Therefore any abnormality of patient is readily noted early in the induction and changes made in the mixture to meet the requirements.

4. The desired plane of anesthesia is approached slowly and when reached the addition of the standard requirement of oxygen for the type of patient will in most cases maintain anesthesia evenly on that plane. Anesthesia seldom need be carried beyond the first plane of the third state. This leaves the maximum margin of safety. Over-anesthetization is to be avoided. It tends to produce shock and its accompanying evils.

THE CARRYING PERIOD

Nitrous oxid-oxygen anesthesia is discounted or discredited by many patients because anesthesia has not been maintained until the operation was finished. Pain was the result, and the anesthetic, not the anesthetist, blamed for the failure. Such patients require much persuasion to again submit to the same anesthetic. Their confidence in nitrous oxid-oxygen can be restored only by experiencing such anesthesia properly and successfully administered. If the patient recalls the sensation of pain, even though inflicted for a moment only, he declares and believes that he was conscious throughout the whole procedure. A frequent error is to complete an operation almost finished after the patient has partially recovered from anesthesia.

There are those who set for themselves the task of anesthetizing all patients without any cyanosis. In extra-oral operations, where the face-inhaler may be used to exclude all air, with patient properly prepared and premedicated, it is conceivable that cyanosis may be avoided. But dental patients seldom receive special preparation or premedication. If anesthesia is maintained sufficiently deep to allow latitude for the dissipating effect of air breathed, some cyanosis is usually apparent.

Attempting to avoid cyanosis often results in too light an anesthesia to abolish pain. Operating in a semi-conscious stage causes harrowing dreams which are not soon forgotten.

If at any time during the operation there is sufficient recovery to permit pain, anesthesia should again be established before complete recovery from the anesthetic is permitted. Any recollection of pain by the patient will be effaced by so doing.

With anesthesia well established any difficulties in maintaining anesthesia on an even plane are largely or entirely due to the uncertain amount of air entering through the mouth during operation.

The amount of air breathed is minimized by closing the exhaling

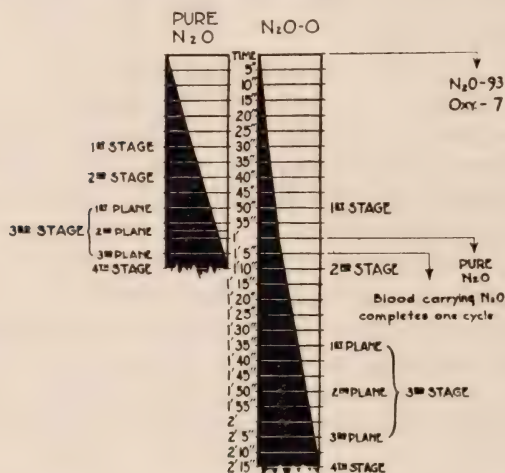
valve of inhaler and increasing the volume of mixture beyond the amount to supply breathing.

The manner of breathing should be carefully noted. This will assist in anticipating changes in depth of anesthesia, and the oxygen can be manipulated to forestall the changes.

At best nitrous oxide is a rapid anesthetic and it is quickly eliminated. Therefore, all symptoms should be carefully watched, that changes be early noted and corrected.

ANESTHESIA INDUCTIONS COMPARED

Showing Displacement of oxygen by nitrous oxide in the blood



ADVANTAGES

Of combining oxygen with nitrous oxide during anesthesia induction

1. More comfortable—eliminates or lessens the feeling of suffocation.
2. Little or no excitement.
3. Little disturbance in regularity or depth of breathing.
4. Symptoms develop slower and are therefore more easily interpreted.
5. Safer to gradually approach the desired plane of anesthesia.
6. Better distributed anesthesia, easier to maintain.
7. Less shock and tendency to nausea.

With a knowledge of symptoms and careful attention to details of administration, nitrous oxide-oxygen is a most valuable anesthetic for dental surgery. With a standardized induction uniform results are obtained in normal cases. Marked abnormalities affecting patient's susceptibility to anesthesia usually can be previously ascertained by observation of history. If not, such abnormalities are

readily detected early in the administration and are dealt with according to indications. Oxygen used in the induction gives you time.

The important points in anesthesia induction are summarized in the accompanying chart. The diagrams are intended to show the rapidity and degree of displacement of oxygen by nitrous oxid in the blood stream.

DENTAL ASSISTANTS

BY LEONIDAS F. SMITH, D.D.S., INDIANAPOLIS, IND.

ADENTIST IS LIKE A FELLOW with a hare-lip—he is born with a handicap. His handicap is the limit of his power of production. There is no other profession which is so circumscribed. It does not make any difference how large a practice he establishes,—he is solely dependent upon the limit of his own ten fingers. There is no limit to the earning capacity of the lawyer. The M. D. has wonderful possibilities. An architect's ability is his only limit. The poor dentist only is compelled to stand in one spot all day long and slowly and painstakingly deliver the goods.

My subject deals, not only with a possibility, but with a tried and proven method for increasing the earning power of the dental profession.

You are the dentist. Your aim is to do the best you can for your profession, your patients, yourself and your family. You are a good operator, constantly seeking to improve your knowledge and technic. You possess a diploma and certificate to practice in the state and county in which you live. This gives you authority, which you must exercise with judgment and wisdom. You are responsible for the proper care of those presenting for your services.

If you are to succeed professionally, you should make money enough so that your mind is free to devote wholly to the responsibilities of your obligations to the public.

Take for granted that you are practicing in a good live town, or in the city. You must have a system under which to work. Your office equipment consists of the necessary chair, cabinet, engine, instruments, laboratory, lathe, etc. You have one head, two eyes, two hands and the average amount of business and professional ability.

You have to answer all the telephone calls, whether intended for you or not, come back and wash your hands before going to the chair. You must attend to the door every time there is an alarm, and come back and wash your hands. You see all the salesmen who come your way, whether you want to or not, and come back and wash your hands. You see all patients in and out and come back and wash your hands. You make and carry out all contracts, mail all bills

(providing you have had time to complete any dental work), collect all accounts, keep all books, clean all instruments, change all linens, do all the laboratory work, every day the same over again, until you hate your patients, your office and yourself for ever having studied dentistry.

The trouble is that you have been spending time which is worth from \$5.00 to \$25.00 per hour to do a lot of work which you could hire done for from \$15.00 to \$25.00 per week.

Many offices are run this way from the time they are opened to the public until they are closed by death. Others have a \$6.00 or \$8.00 a week girl to answer the telephone and the door, and who spends the balance of her time crocheting and gossiping in the reception room.

Right here I want to ask you, if you were hired to manage a dental office, including the dentist, would you run it in accordance with the above program? Would you be satisfied to see the dentist plod along, wasting valuable time as we do, not by loafing on the job, but by wearing himself out trying to do everything himself? When business begins to grow, because the dentist does good work, would you not consider it good business to keep him working at the chair and hire brainy and efficient assistants to relieve him of everything except the making of contracts and the actual work in the mouth?

This brings us to the work of the Dental Assistant. Too many of us regard the Dental Assistant as something purely mechanical an extra pair of hands perhaps, but on the whole about as much trouble as she is help. This is an old-fashioned and out-of-date idea. If it were impossible to hire brains as well as hands, where would the business world be today? Sometimes you may even get better brains and better hands than your own. But you have the diploma and the authority to conduct the office and are responsible. True, you may have to try two or perhaps three assistants for a very short time before you get the right one, but this should not prove to you that they are not to be had. Does the business man of today, the banker, the lawyer, give up and try to run his affairs single-handed because his first experiment in hiring clerks was a failure? No, he tries them out until he finds the right man for the right place, whatever it may be, and one of the big factors in the success of any man of affairs is his ability to employ and train men and women to carry out his requirements.

To my mind and in my experience with securing competent assistants, (in which I am pleased to say I have been quite successful up to the present time) the first step has been, during the interview with the applicant, to impress upon her most thoroughly, the fact that she is entering a profession, not as a mere servitor, but as a part

of the profession, as an assistant to the dentist, and on an equal footing with the dentist. The more she feels this responsibility, the better assistant she will become. If she comes from the business office or store, I tell her that henceforth her work is on a much higher and broader plane than formerly, that my patients and the public as we meet them in our office, will judge me by the impression she makes upon them, they will judge my work by the standard of her efficiency. In other words, she either lowers or raises the tone of the office by her association with it. This will put anybody on her mettle and is as true as gospel. You do not need to be a student of human nature to draw a pretty good character picture of the president of any corporation, by the calibre of the men employed. From the chief-clerk down to the office boy they will run pretty much the same.

To go into detail with regard to the work of the Dental Assistant, it is to my mind, very clearly divided into three classes, namely; first, the Business Secretary, second, the assistant at the chair, and third, the assistant in the laboratory.

The numbers, first, second and third refer to the order in which the training should be carried on. I say, training, because we are all aware, that it is "almost" if not "quite" impossible to hire a well-trained dental assistant. Therefore, a dentist who is not willing to take the time and put forth the effort to train his own assistant is admitting at the very beginning, that he is going to be satisfied with an out-of-date practice, is not going to make as much money as he could make, is not going to give his patients the impression that they are getting the best service that can possibly be obtained anywhere, and in short, is not practicing dentistry as it should be practiced in this day of 100% efficiency.

To the dentist who says, "But you cannot teach one girl to be a good business secretary, a good assistant at the chair and a good laboratory assistant—that is expecting too much of any one person,"—isn't this rather egotistical on the part of that dentist? Is it impossible to expect any bright girl or boy to learn a very small portion of what he himself has learned in a comparatively short number of years, or to be able to comprehend, even with strict application, the deep workings of his ultra-fertile brain? Either he reasons thus, or admits himself a failure as a teacher, and why admit failure without a fair and honest trial of one's-self?

The business secretaryship, while not the most important of the assistant's work, should come first in the course of training, for the following reasons:

1. Because it is normally the place to begin;—to teach a girl to do the telephoning, receive and dismiss patients, write letters, make out the bills and keep the accounts.

2. Because it is the first work a dentist should be relieved of, in order that he may give the patient his best work, without interruptions and with his mind free of petty worries arising from one or several of the above causes.

3. Because it is easier for the assistant to present the bill and collect the money at the time the work is done, than it is for the dentist to do so.

Unless there is an assistant at the chair, in addition to the business secretary, she should make the appointments. She can do this intelligently by consulting with the dentist just before dismissing the patient, as to what he proposes to do for the patient next and approximately how long it will take. She can then take the patient to the business office and arrange the time accordingly. If it is an appointment to be made by telephone, she can take her book to the chair, and with very little interruption, arrange with the dentist for the time. If it is a new appointment, she does not have to consult the dentist, merely consulting her appointment book and giving the patient the first convenient hour. Only in cases where the patient requests the dentist to speak with him should he be interrupted for this purpose. Of course where there is an assistant at the chair exclusively, the making of appointments devolves upon her, as she can in almost all instances make them as well if not better than the dentist himself.

Contrary to the opinion of a great many dentists, the patients will not feel slighted nor take offense because the dentist does not drop everything and come to the phone to make appointments with them. They soon become accustomed to transacting all purely business matters with the business secretary, and when they get into the chair, they feel confident they are getting the best service obtainable, and that "*their*" dentist is too busy and too much in demand to be answering telephones and entertaining patients.

If you have chosen your business-secretary wisely, and have trained her properly, by the time she has accomplished the foregoing degree of training, she has acquired an increasing interest in her work and your work, in your office and her office, for she should be made to feel that it is her office the same as yours while she is employed there, and that upon her success depends your success, and upon the amount of her assistance to you depends the amount of service which you are able to render to the public. The responsibility is entirely yours. The more you regard her as an integral part of your organization, the more she will become a part of it. The lack of interest on the part of Dental Assistants in the work of the dentist is only a reflection of the lack of interest on the part of the dentist in the work of his assistant. He shows very little concern as to her improvement, does not encourage her to read dental literature nor

attend dental meetings; therefore, she takes little if any interest in availing herself of these methods of self-improvement and greater assistance to him. When I hear a dentist belittling the work of his assistant, I take it always as a reflection upon himself and not on the assistant.

Therefore I say, if you have proven yourself a correct teacher and she has proven an efficient secretary, it will be a simple matter to begin on the work of training her to assist at the chair. To do this, if you are busy and have established a large and remunerative practice, it will be necessary to hire a new business-secretary, but you will not be required to train the new one. Your assistant at the chair, in addition to waiting upon you, will take up the work of training the new secretary; and in fact I believe it is a much more satisfactory arrangement to hire the new girl, if necessary, as an assistant to your assistant, make the old assistant responsible for the new one, and the new one subject to the old one. This lets you out entirely and you are freed of everything except the actual work for the patient, and in a very short time this will become greatly facilitated by the assistance you will receive at the chair. At the same time you are building up an organization which not only means money to you, but satisfaction with the service you are rendering to the public, peace of mind that you have been relieved of endless details, and no doubt length of days to enjoy the gratitude which you have richly earned.

Detailing the work of the assistant at the chair, I found to be rather a tedious procedure and decided that I could probably give you a better conception of it by reciting the actual details of some work at the chair.

You come in to the office a few minutes before nine o'clock, the assistant has everything ready, instruments sterilized, fresh linen placed and a fresh gown laid out for you. She has on your cabinet, or on the wall near the cabinet, a list of the day's appointments and the service to be rendered each patient. This list saves you the time necessary to look at the appointment book and consult with the assistant about the work for the day.

Let us say your 9 o'clock appointment is with Mrs. Johnston, for an amalgam filling in a lower first molar. The patient is in the chair, napkin adjusted and two glasses of warm water ready, one for the patient to rinse her mouth and the other for use in flushing the cavity as you prepare it. Your burs, stones, chisels, enamel trimmers, water syringe, etc., are all on the table and you are called to the chair to begin the day. While you prepare the cavity the assistant gets out the matrix, wedges, alloy, mercury, amalgam-carrier and pluggers. When you have finished the cavity preparation, all but the filling instruments are removed from the table and

nothing left to interfere with the work of filling the cavity. The amalgam is mixed for you, the carrier filled and placed where you can pick it up without looking for it. Each time you are ready for another pellet you find it ready. When you have finished you have saved time, worked your amalgam faster and have a better filling than if you had been working alone. While you are carving the occlusion she is removing the instruments and getting the appointment-book prior to dismissing the patient.

Your next patient is Mr. Brown—your list shows preparation for gold inlay, upper right second bicuspid. You are called to the chair when Mr. Brown is seated. As before you find all the instruments ready for you to proceed. The wax, instruments, etc., will appear on the bracket-table as if by magic, just as you are ready for them. When you have completed carving the wax form, you find right at your finger tips the sprue former and pin upon which the wax form is to be placed for investment, and temporary stopping for the cavity. This is all you see of the wax pattern until the next appointment, when patient, gold inlay and instruments appear simultaneously at the appointed time.

When not actually engaged at the chair, the assistant has plenty to do. She is constantly watching the supplies and ordering materials, so there are no more exasperating delays and re-appointments caused by finding your supply of a certain material exhausted just when you need it most. Then there is the waiting list and every dentist should have one. A day with too many appointments is a day almost wasted. When a rush-time comes, instead of crowding the appointment-book, the waiting list should be resorted to. The assistant-at-the-chair should watch this list religiously and call the patients at the first opportunity, in the order in which their names appear. is practically nothing in the laboratory which an assistant cannot be taught to do.

This is enough to show you that the dentist is now free to carry out the resolve which he has made at every Dental Meeting he ever attended—to go home and improve his technic. He is sincere, too, and has always meant to do better work in order that he can demand better fees, but he goes back to his office and things start coming so fast that he has had to do things the quickest way in order to keep from getting swamped entirely. But at last his day has come, he can relax and experiment with new methods and improved technic—yes, he can even run away for a few days now and then to get new ideas—take a post-graduate course perhaps, watch Dr. So-and-So make some of his new removable appliances. In an amazingly short time he is becoming expert in most of his technic and is

turning out better work and in much less time; is receiving better fees and has a longer waiting list than ever before.

Bankers Trust Bldg.

COMBINING GUTTA PERCHA WITH RUBBER IN PARTIAL DENTURES AND REPAIR WORK*

BY C. H. MARTIN, D.D.S., WILMINGTON, OHIO

ATTACH CLASP; wax lingual sides of cast with paraffin, (avoid under cuts); wax buccal sides with one thickness of vulcanizable gutta percha. Attach teeth, using gutta percha, then put pink veneer on top of gutta percha, smooth and paste same to model with paraffin. Then invest in lower half of flask, allowing plaster to come up over teeth. After varnishing and oiling pour the other half of flask and separate cold (do not boil out as you will misplace your gutta percha); also avoid undercuts, as you may break your mold. Then I peel out the paraffin and pack in the rubber in cold flask. With this method there is no danger of breaking the mold, or misplacing the teeth.

BROKEN RIMS

Paste parts together, oil inside of plate, pour plaster model, remove same when set, saw rims straight down in line of second bicuspid and first molar, level same from outer and inner sides, and drill small holes in beveled edge. Now remove all parts of old rim between teeth, and drill small holes, under-cut between the teeth, then cut under-cut slots just over pins of teeth, pack these with gutta percha and iron down smooth, so plate will go to place on model, then pack small holes between teeth and in beveled edges of rim with pink rubber. Place plate on model and finish packing with pink rubber; then part same to cast, and iron down smoothly with paraffin. Dampen model and invest in whole flask, screwing bolts together before plaster sets.

REPAIR BROKEN LOWER PLATES

Wax parts together from inside of plates, put thin smear of wax on pink side over crack, with most on lingual side. Invest with teeth down in lower half of flask, letting plaster come to top of rim of plate. Then cut one long under-cut slot in center of plate for strengthening bar; then other under-cut slots in lingual and labial sides (in side of plate). Then cut V-shape groove in line of labial crack. Do not cut clear through the pink, but almost; do not expose the patch. The lingual side fix as you like with holes, slots, etc. Now place strengthening bar in place in long slot in center of plate.

*Given as a Clinic Ohio State Dental Society, Dec., 1921.

Pack tight with vulcanizable gutta percha, all slots and holes except V-shape slot in pink rim; pack that with a good pink rubber. Now iron down smooth the gutta percha and rubber. Do not varnish or oil, but pour other half of flask. Put in bolts and screw together before plaster sets. Use a quick setting plaster and you will save time.

REPLACING PIN AND DIATORIC TEETH WITH GUTTA PERCHA

For pin teeth cut wedge-shape slot back of tooth, and under-cut same. Warm gutta percha into slot and around pins. Smooth down with warm spatula with a little paraffin. For diatoric teeth drill hole in plate opposite hole in tooth; bevel same from inside of plate; also notch hole in three or four places; place tooth on plates, hold tooth firmly and pack hole in tooth and plate with warm gutta percha and smooth down with warm spatula and paraffin. Pour quick-setting plaster in plate. Mix other plaster; pour flask; screw bolts down while plaster is setting. When set, vulcanize a little longer than you would rubber.

MODERN TENDENCIES AND FUTURE DENTISTRY*

DR. R. M. OLIVE, FAYETTEVILLE, N. C.

WITHIN THE LAST FEW YEARS the earth has entered upon an era that surpasses the greatest expectations of the 19th century philosophers. Civilization has advanced at a rate compared to dental progression; and today we are living in the *Golden Age of Science*.

In looking back upon this century we should review some of the most significant achievements of the past and note their bearing upon progress and their relevance to the science of today.

The dawn of modern science occurred in 1898 when the discovery of radium and its radioactive properties was made by the Curies. The importance of this discovery can never be too greatly emphasized for it marks the actual conception and birth of the principles upon which today's science is founded. The untiring investigations of those great pioneers of modern science, Rutherford and Soddy, in the field of radioactivity soon caused them to announce the hypotheses of atomic disintegration and evolution of the elements. Although these theories were at first discredited and regarded in the same light as perpetual motion, the undeniable existence of enormous reservoirs of energy in the minute atom, as evidenced by radium, soon attracted the attention not only of scientific circles, but of the whole world. Discovery followed discovery. Research became busy with the momentous question whether artificial means could accelerate or

*Annual essay read before the North Carolina State Dental Society, 1921.

retard the process of spontaneous disintegration. Civilized nations became excited and expectant.

Vivid fiction, exploiting the imaginary results of the discovery of atomic disintegration, was widely read, and increased the credulity of the people.

It was about this period that the Great War occurred. Although the world disaster took a great toll of life, it proved to be an impetus to scientific advancement. At the close of the war, the United States found itself the creditor of almost the entire European continent, whose nations were on the verge of bankruptcy and revolution. Unrest was widespread. Crises between labor and capital were imminent. Numerous strikes occurred and Bolshevik uprisings in Russia threatened to undermine the governmental control and order. The air seemed charged with something that stifled all thought of resuming pre-war existence. Over all hung unconscious, vague dread, grasped in its entirety by only a few minds of scientific preeminence. Prophets and religious fanatics preached the end of the world and the arrival of the millenium. The world was ripe for some cataclysm that would overwhelm civilization and possibly sweep all life from the planet.

The world-wide spirit of unrest and discontent as the resultant aftermath of the recent war, or as one writer has termed it, the moral shell-shock from which the world is suffering, has very much affected the world of dentistry. The reaction of the dental profession has been a forcible realization of the necessity of the adoption of the methods of practice which will more nearly meet the increasing demands upon dentistry, and the most hopeful direction seems to be that of prevention.

For decades we have been endeavoring to impress upon the medical profession and the public the importance of the oral cavity as a factor of bodily health and disease, and to convince them of the latent potentialities for evil that the oral cavity harbors. The mouth has at last received full recognition as an important, if not the *most important*, organ in the body. It was not, however, until the radiograph came to be generally applied to dental practice that such recognition came, and the impetus it has received, through the medical profession and the public, was so overwhelming at one time that it threatened calamity to the dental profession. Indeed, the time is so recent we have not entirely recovered our equilibrium.

From absolute disregard of the human mouth as a factor in bodily disease, to considering it the most potent factor in the causation of bodily ill's, would seem like a giant stride, but it is one that the medical profession can and did make with great ease. In fact the medical profession has been notoriously facile in its chameleon-like changes from one fad to another for many centuries. It is prolific in fads, which soon pass into oblivion, which they deserve

and herein is the hope of the future in our present newly-developed relationship to our mother profession. The medical profession, we feel, is unquestionably equal to the task of retracing its extreme radical steps toward elimination of all diseased dental conditions to a safe and sane ground. Indeed, we are happy to see that some of the leading medical men have already seen the dangerous extreme towards which they were tending and have called a halt, and are now in a mood to concede the claims of the more conservative element of dentistry. This is, and should be, for if the focal oral infection tide had continued to swell we should soon have become a toothless race. The physiologic function of the mouth and teeth as the first, and one of the most important of the organs taking part in the process of digestion, seemed to be entirely disregarded and our path of vision to the ideal in dentistry seemed hopelessly obscured.

The opprobrium of such radicalism is not all upon the medical profession; some members of the dental profession have gone to a great extremes as the medical profession, and so we are still exhibiting hysterical symptoms of radicalism. One prominent English dentist went to the absurd extreme of extracting all of the teeth of one of his young children in the hope of avoiding all numerous evils which have been attributed to focal infection in the oral cavity.

As long ago as 1882, the well-known Dr. Welch, editor of the *Items of Interest*, in commenting on the tendency, likened the dental profession to Barnum's elephant on a see-saw: "His anxiety to get to the extreme height of the plank makes him pass the center, when he finds himself suddenly brought to the ground. Though he often repeats his experiments he is seldom content with the most elevated position attainable—the center." However, it is an ill wind that blows no good, and the beneficial result of our most recent fetish has been to awaken the dental profession to the sins of commission and omission in the past and to arouse in all ranks the desire to improve the methods of practice continually, so that we may creditably perform the mission of dentistry: namely, to practice and preach preventive dentistry, and to save teeth thereby rather than extract them.

Much of the radicalism above referred to has come from a misinterpretation of radiographic findings, and this valuable addition to our practice will eventually, we feel, prove to be one of the greatest advances made in many decades past. When we arrive at the point where we can properly interpret our findings, we do not believe they will point, as some think at present, inevitably to the removal of every affected tooth. Too much reliance is being placed upon the X-ray film and its interpretation as the final diagnosis of

all cases. It will eventually prove an invaluable adjunct to dental practice, but it will be as a diagnostic aid to clinical manifestations.

The medical profession has challenged us to make the next great step in preventive medicine. We are taking that step, and the public is impatiently awaiting the result. We cannot make the step successfully, though, without the cooperative aid of the medical profession. Mayo says the trend of modern medicine and dentistry is bringing their fields more closely together. The recent war was undoubtedly the means to this desirable end, but more recently this cooperation in some quarters is more apparent than real.

Varied efforts from various directions are being made to solve the problem of caries. Research work in this field is encouraging, and we believe the most promising field of discovery in this line is in the diet. The character of the saliva undoubtedly has an important bearing on the prevalence of caries, but when the much-discussed question is better understood, it will very likely throw light on the caries causation.

At present the greatest difficulty the profession has to deal with is lack of interest in research. The average dentist is so busily engaged in practice that he has little inclination in this direction, and for this the conditions under which he works are largely to blame. Dentistry is a profession that makes enormous demands on the nervous energy, and is becoming more difficult each year. The field is broadening, and has become so large that it is fast developing, by force of necessity, into specialized branches, and herein lies the hope for technical skill.

Since the dental field is broadening, preparations must be made to take some of the burdens and responsibilities from our shoulders, so we may spend more time on the skilled and better paying part of our profession, to enable us to devote more time to research. Some of these steps have already been commenced, but have not been developed and endorsed by the profession as much as they will be in the near future.

Our first step will be to educate the laboratory assistant. The *average* commercial laboratory is pictured to the dental student as an institution of the devil—and should be so considered. Let those who direct the educational progress of our profession apply the remedy. Our dental colleges have a definite and urgent duty to the profession—the duty of educating the laboratory assistant. There are a number of so-called schools of mechanical dentistry. In these so-called schools it appears that the instructor should first learn before attempting to teach. Perhaps there is already an organization among the dental colleges which could prescribe the kind and amount of education necessary to train the assistant in the quickest and most positive manner. If not, one should be organized. Every laboratory assistant need not know all branches of prosthetics. Instead

of graduating men from a course of mechanical dentistry, we should issue certificates for each branch taught. It might be advisable to license competent workmen as a means of protecting ourselves against inferiority.

It is not for the practicing dentist to tell the colleges just when and how the courses shall be conducted, nor to prescribe the technic; but it might be suggested the colleges can get some very practical help with cooperation with the commercial laboratory men. This may seem like the lion and the lamb lying down together, but the college professor will learn that the laboratory man is somewhat of a lamb, just as the laboratory man will learn that the college professor is not such a lion, after all. The antagonism of the past has been due to the fact that the antagonists have been neither lions nor lambs, but have more closely resembled a braying animal with large ears and a stubborn disposition.

The physican has ceased to roll his pills and peddle them from house to house. He recognizes the pharmacist and makes use of the bacteriological laboratory in which work is done by persons who do not possess M. D. degrees, but who, nevertheless, are capable of getting more accurate results with less expense than it is possible for him to do.

In just such a way should we recognize our next co-worker, the dental hygienist. Her cause is firmly endorsed by the most successful men in the dental profession.

Medical and dental sciences have developed far enough to prove that an under-developed child physically is usually under-developed mentally. The dental hygienist in the public schools not only can clean the children's mouths, but teach and help them form the habit early how to prevent decay. Only about 10 per cent. of the population of the United States goes to the dentist regularly. This is an age of enlightenment, and education is being thrust upon everyone to a much greater extent than ever before. If this special course is required in all our public schools, as I predict it will be in a short time, there will be a great rush to the dentist and we will not be able to take care of them. Here is where our licensed and efficient hygienist will step in our offices and lift some of the responsibilities from us.

PROFESSIONAL ECONOMICS*

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THE TERM "ECONOMICS" was originally restricted in its application by early writers to the subject of tariff, taxation and general financial problems. In later years it has been developed and made sufficiently inclusive to embrace many and varying phases of human effort until at the present time we find general economics subdivided according to specialized activities, under the following definite headings: Political economics, industrial and commercial economics (frequently referred to under the term of efficiency), social economics, domestic economics, and to these we are proposing to add professional economics. To each and all of the above-named subdivisions, or departments of economics, special study and experience in the application of scientific and proven lines of procedure are demanded in order to justify one's claim to special knowledge on the subject and insure a reasonable degree of recognition and attention to his teachings.

For example, the statesman, if he is to attain to the highest possibilities in line with his calling, must devote a lifetime to the study of some phase of government, and be able to evolve, promulgate, and apply sound principles and policies which will readily fit into the general scheme of the government at the period of his active participation in its affairs. The sociologist finds special interest and satisfaction in delving into the subject of indigency in society, and attempts to establish logical reasons for the same, and, through recommendations and an appeal to the thrifty element in society, seeks to alleviate the sufferings of the needy poor without working a harmful effect on the recipient of charity, or permit of an imposition on society itself. These same principles apply in all departments of economics, and very naturally play an important part in the success or failure to measure up to the needs of the times.

With the foregoing as a background, let us proceed with a discussion of our special subject, "Professional Economics." In this undertaking it will be necessary to accept certain general statements in lieu of actual definite facts around which to build a treatise of the subject assigned for study.

Rather recent propaganda carried on by recognized professional publications under the title of "Dentistry for the other 90 per cent." leaves an inference that only ten per cent. of our population are

*Read before the North Carolina State Dental Society, 1921.

regularly getting dental service at this time. Whether or not actual statistics exist to prove such conditions is not known to the writer, nor is it regarded as being necessary and essential for our present purpose, since this data can be obtained through another and rather reliable source, as follows: Through a recorded statistical study of some years standing it is shown that 400 patients annually is the maximum number for whom a busy man can render dental service. If, then, the busy and skillful operator cannot serve more than 400 individual patients during any one year, the less dexterous and less occupied men in the profession would possibly bring the general average to 250 patients each per year. By multiplying the general average of patients (250) by the number of dentists in this country (44,000), the result obtained will be 11,000,000 patients or ten per cent. of a total population of 110,000,000. Granting that the maximum figure adopted (400) is correct, and assuming that every man in the profession was working at the highest rate of speed and at full capacity, not more than 16 per cent. of our present population could possibly be served with our present full professional force. This clearly indicates an economic weakness which should not be overlooked.

The public is rapidly being educated to the urgent needs for dental service in the interest of general health. Of the many channels through which this instruction is being disseminated, probably the most potent and directly convincing effects are coming through the medical profession.

The following recent statement made by Dr. Leslie L. Lumsden, of the U. S. Public Health Service in an address made on June 8th, 1921, to the American Medical Association at its annual meeting held in Boston, is a very significant example of the recognition now being accorded us by the medical profession.

"The conclusion is inescapable," he said, "that the treatment of diseased teeth, the removal of diseased tonsils and adenoids, the rendering of prenatal care, the diagnosis and treatment of tuberculosis and the correction of certain other physical defects are, whether performed in the private office or in the public health clinic, for the prevention of disease and the promotion of health and, therefore, may properly be regarded as service of a public health nature."

Industrial, educational and governmental interests, the latter through army and navy channels, have all added materially to spreading the gospel of oral hygiene.

In addition to the growing sentiment all along the line favorable to wider reaches in dentistry, the Chicago Dental Society, at its meeting held in January, 1921, promulgated a movement in the interest of preventive dentistry, which contemplates the care of the mouths of the children of the first and second grades in the Chicago schools. As recorded in the March Issue of *Dental Facts*, the watch-

word of the movement is "Keep the ball rolling." Dr. M. M. Printz, secretary, says: "And this army (the 5,000 dentists in attendance), agreed to a man that the way to check the prevalence of bad mouths and devastating infections that result from them among American men and women is to begin working upon the little men and women—the children. The adults' teeth can be repaired, restored and replaced, but no adult will have the sort of mouth he should have unless the care of the teeth begins when young. If we cannot reach him then, we at least can reach him when he enters school."

Dr. Dan U. Cameron, of the society's public service committee says: "This movement is one of the biggest humanitarian things this country has ever seen set in motion, and has gathered a momentum during the last three days that must not be lost."

In the above quotations we have a theoretically exact fact set forth, and the plan by which it is proposed to remedy known conditions is ideal, and the results predicted are surely plausible and worthy of the greatest credence. Despite the altruistic principle on which the proposition is founded, and the perfectly patent effects to be attained by a whole-hearted support of the project, it may, nevertheless, be of some practical benefit to apply the economist's principles to the scheme as presented by this group of live and progressive men. In other words, to make an analytic survey of the whole field, and then set up against our findings the forces available through which it is proposed to accomplish such desirable ends. By such study we may the better grasp our problems and be enabled to approach them from an intelligent and hopeful aspect, rather than to allow ourselves to be led into disappointing, if not retroactively injurious policies.

National educators tell us that there are in this country today something like 20,000,000 school children in the primary grades, and about half of these (10,000,000) are in the first three grades. By a liberal elimination of those in the third grade, and the few in the first and second grades who may be cared for by the family dentist, it is reasonable to assume that at least 4,000,000 would remain to be cared for by a universal application of the Chicago plan.

Keeping in mind the fact that these little folk are being introduced to a new, and, perhaps, painful, or, at least, unpleasant experience, and also assuming that the work of prophylaxis and restoration is to be thorough in every respect, it is doubtful if the operator will be able to exceed the limit as to the number of patients yearly served set for the man in general practice. Granting that one man might properly care for 500 children annually, it would require 8,000 dentists to cover the whole field. The idea may be to have at least a portion of the needed service done by hygienists, but, at the present time, they are not available in sufficient number to appre-

ciably change the situation. By a limitation of this work to the children of the first and second grades, much will be lost in the way of educational advantage, and permanent result on the children, if turned adrift at this stage and no provision made by which they may continue to avail themselves of the beneficial service.

In order to intelligently meet this phase of the problem and be able to take care of the remaining grade children, the numbers decreasing greatly in each advance above the second grade, possibly another army of 8,000 dentists would be required to handle the work. The Chicago plan for preventive dentistry, as proposed, must of necessity be regarded as developmental in character, and can only be successfully met by numerical additions to an already overworked profession.

The difficulty presented through an evident lack of sufficient numbers to cope with the situation, as presented by the Chicago society, is not the only one which we shall be called upon to solve. The children of the indigent poor are presumably to be given first consideration. From an economic standpoint, the state might expect to gain most through any health conservation policy which would tend to prevent the poor from becoming public charges in hospital, asylum, or almshouse. This proposed dental service to the needy poor must necessarily come to them as a gratuity. Ways and means must be provided whereby financial aid may be secured to meet the needs. By applying the Chicago scheme universally to the whole country, the sum total of financial needs will prove staggering. Briefly summarized, they may be made to appear as follows: Basing the needs for equipment on the number of dentists regarded as being necessary to treat the mouths of the children in the first two grades of the public schools (8,000 dentists), and figuring the cost of each outfit at \$1,500, we get a total of \$12,000,000. Add this to a minimum salary of, say, \$2,000 per annum for each of the 8,000 dentists required, and this will total \$16,000,000. By an addition of equipment and salary totals, we get a grand total of \$28,000,000 needed as a possible outlay to make a beginning in the proposed new venture into health conservation and preventive dentistry. The above estimates do not include cost of housing or office accommodations, which would increase the total costs considerably. This is unquestionably a big order, and only through a positive demonstration of beneficial returns to humanity can it be made to justify itself and give promise of hope of putting it into effect.

Many systemic diseases are attributed by physician and dentist alike to oral infections as being the primary cause. Various forms of rheumatisms, certain heart lesions neuritis, eye, kidney, liver and lung lesions, sinus infection and general septicemia make up a partial list of diseases which may be properly regarded as possible of minimizing to some extent through a thorough application of

general dental service to the masses. This list does not include the grave and unfortunate condition of insanity, which some physicians today are claiming is being successfully treated by mouth hygienic measures. If such treatment cures even a small percentage of these cases, it would seem to be a wise, humane and economically sound policy to apply preventive means in the eradication and prevention of the conditions responsible for the malady, and, by so doing, spare the individual the humiliation which attaches to those so unfortunate as to suffer from mental aberrations.

A source of available funds with which to undertake this work must be discovered—a full and complete study of our needs, and the great good possible of accomplishment through an expanded dental service to mankind definitely set out and made the basis for an appeal to governments, both Federal and State, for aid in the work.

The following is presented for the purpose of showing what was done by the Federal Government for the eradication and prevention of diseases of animals during the year 1920:

Sheep and Cattle.....	\$ 525,000.00
Tuberculosis.....	1,500,000.00
Hog Cholera.....	641,045.00
Cattle Tick.....	741,980.00
Dourine.....	88,800.00
Total.....	\$3,496,825.00

The above named Federal appropriation was supplemented by State, county, corporation and individuals by liberal amounts. The exact totals of these are not available to the writer, and time did not permit their accumulation, but, it is reasonable to assume, that the aggregated sum so provided will equal, if not exceed, the \$3,496,825.00 of Federal appropriations, making in round numbers a total expenditure of Federal and State governments, etc., for animal health and conservation range between \$7,000,000.00 and \$10,000,000.00. No sane individual will question the economical value of protecting animal life, but its importance can in no sense be placed above the need for doing the same thing for human beings.

Again the Federal and State governments expend each year vast sums of money for the purpose of inspecting and guaranteeing to the people that the food offered for consumption shall be pure, free from subterfuges and injurious adulterations. No figures are attainable at this time by which the exact amount so spent annually may be shown. Doubtless, this item also runs into the millions. The great desirability of having pure food with which to feed the mouths of the growing young, and to support the strength and energy of the working adult, is an admitted need, and no criticism can be offered to governmental policies in this matter... However, this good work and intent might be carried one step farther with

promise of greatly enlarged benefits. For example, impure or contaminated food is not likely to do much damage to the system, unless it be received into the stomach. It is only too well known to us as practitioners of dentistry that in the mouths of many children, and in not a few grown-ups, there exists pus and disease germs by which the purest of foods become contaminated in the process of mastication and insalivation. One can only surmise at this time what might be the effect on those in authority, if, through a test made by placing absolutely pure food into the neglected mouth of a child, and after thorough mastication, examine the bolus and give to the world a finding. It is safe to say that said food would not be given the stamp of being absolutely pure.

The workers in Field Investigation in Child Hygiene, in charge of Dr. Taliaferro Clark, a government medical officer, have already gone into the question of under-nourished children in large centers of population far enough to be convinced of the helpfulness afforded by dental service in bringing these children up to normal weight.

In the light of what has been set forth in this paper we must conclude that the job is a big one. The opportunity, however, justifies an attempt to broaden the scope of our work in the interest of the public health and welfare.

Caleb, who was the statesman under the leadership of Joshua when the Israelites entered the Promised Land, casting his eyes over the field for the purpose of determining a recompense for his part in the conquest, said, "I pray thee, give me this mountain." Caleb deserved largely and asked for a big thing. Dentistry is just now entering a field of great promise; let us set ourselves the task of a full and complete conquest, and, like Caleb of old, not hesitate to ask for a mountain.

THE PRACTICE OF EDUCATIONAL DENTISTRY*

BY PAULINE McDONALD HEIBERT, D.D.S., AKRON, OHIO

THE FACT THAT IT IS NECESSARY to continue to harp on the gospel of the clean mouth is pitiful. There isn't one single idea here that is new. It has been told over and over again. The topic is threadbare but still needs discussion. You may be weary of it but its importance is not thereby lessened. We may have the knowledge of its importance and not impart it. Regardless of the differences of opinion as to what methods should be used in the education of the patient the fact remains that *some method must be adopted* and that method must be put into practice.

The essential factor in the accomplishment of any result is the desire to win—the desire to succeed—the desire to accomplish. It is astounding what we can achieve when we have the *desire*. And so the underlying thought in this discussion is the hope that it will spread a contagion of desire to educate patients. The effect of this education is like a boomerang. The more you educate the more information they ask for. Will the time ever come when patients will fail to ask: "Why was I never told this before"?

A personal interest in each case must immediately follow the desire to educate. No matter to what strata in the scale of human intelligence our patients may belong, they all like to feel that the dentist of their choice is personally interested in their particular case. The atmosphere of interest is essential, and strange as it may seem we cannot create it without really becoming interested—which is a most wholesome state of affairs. It is like the man who told some of his stories so often that he believed them himself. If you are not really interested, make believe that you are. "Make believes" often turn into realities. The patient's welfare depends upon your interest.

No teacher is successful without the desire to teach. No teacher having the desire to teach is successful without an interest in the welfare of his student. And that is just the position that we, as dentists, should find ourselves in with relation to our patients.

The dentist possessing these two qualities finds the education of his patients interesting and possible and even fairly easy. There are as many roads to success in educating as there are educators. I am not here to advocate any particular method of attaining mouth hygiene. I am here to urge that the practice of the most thoughtful workers in the dental field be investigated, adopted and put into practice. What little time there is to converse with the patient,

*Read before the Ohio State Dental Society.

utilize for information of value to them. Take that chance to tell them some of the things that are going on in their own mouths. Not only tell them but show them. A good clear hand mirror is as essential as mouth mirrors and should be almost as frequently used.

Before using an instrument in the mouth the patient will be interested in seeing its exact condition. The patient must be made to feel responsible for the soft deposit found there. The patient will have a deeper and more lasting mental picture if allowed to watch in the removal of this debris. Call attention to the irritated gum margins which are always found with soft deposits. In this way is impressed the fact that the mouth must be cared for not only for cleanliness but also for the sake of the health of the mouth tissues.

The qualities necessary for the dentist's success in educating patients are equally essential for success in following instructions. Once the mouth is healthy, (which by the way cannot be accomplished in 15 minutes) our job for life is to keep it so. In many cases this is no small task. Here again the patient must be instilled with a desire to keep the mouth clean. Use any method to obtain this result—Reason with some of them—Frighten part of your patients—Even shame them—But by fair means or foul create in each patient a desire to cooperate in maintaining a clean mouth.

The necessary equipment for the daily care of the mouth should be explained. This equipment must be so simple that it is possible for all to be supplied. The small brush of the rolling type has been universally accepted as best. The bristle section should be from 1 to 1¼ inches in length. Each patient needs two such brushes and ribbon dental floss. These are the essentials for general use. There are many exceptions in the instructions for their use, each case presenting its own individual problem. The condition of mouths in general could be very materially benefited by the faithful and intelligent use of this simple equipment.

Securing mouth hygiene is a mechanical process and *not* medicinal. Medicaments are deceptive. Patients are fooled into thinking their work has been done for them by glossing everything over with a flavor. No better mouth wash will ever be compounded than the normal saline solution. The general tendency with the American public is to pay big price for some wash or dentifrice and immediately expect that article to do all the work for them. Again—a clean mouth is obtained through a mechanical effort and not through a chemical reaction alone.

Several methods of brushing have been accepted as efficient by the American Academy of Periodontology. A report of these may be found in the *Items of Interest* March 1920. To go into a detailed description here would be entirely too lengthy. Any one or more

of these methods will produce very satisfactory results. The requirement is that the patient be *taught some method*.

In brushing the teeth two objects should be borne in mind—massage of the gums and cleansing the teeth and gums. These are placed in order of their importance. If the massaging is correctly done failure to cleanse will be impossible. The patient must learn to intelligently massage the gums, laying the side of the brush against the gums and with a wrist motion turning the brush, bending the bristles as they turn so that they slide over the gums onto the teeth. This stroke should be used again and again around the whole mouth continuing from three to five minutes.

Patients are more apt to follow instructions if told the “whys and wherefores”. For that reason explain that the length of time required for brushing is not a hobby. We all know that the health of of any one tissue depends upon its blood supply. In this the mouth is no exception. One of the best ways to stimulate a good flow of blood is by exercise. Massaging the gums with a brush is our most effective way of producing *artificial* exercise. The *natural* exercise for the supporting tissues of the mouth is mastication. It seems only logical that we must use a little time in either natural or artificial exercise of the masticating apparatus in order to stimulate a good blood supply. Hence the three to five minute requirement.

When will dentists in general *desire* to give these necessary instructions to their patients? The tendency to lazily follow the lines of least resistance must be overcome. Patients must be given the information that will enable them to care for their own mouths adequately and dentists alone must shoulder the responsibility for their present lack of information. Dentists must be educators if our profession is ever to fulfill its real mission to humanity.

PRELIMINARY REPORT OF AN INVESTIGATION INTO THE OXYGEN PERCENTAGES OF NITROUS OXID-OXYGEN ANESTHESIA.*

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WHEN nitrous oxid was originally introduced as an anesthetic agent, it was used alone or in combination with air. In 1868 Horace Andrews, of Chicago, first called attention to the fact that nitrous oxid and oxygen was a much more *satisfactory* anesthetic mixture. In order to obtain the anesthetic state, in average individuals, at least 80 per cent. of nitrous oxid in the inspired gas mixture is necessary. This leaves only 20 per cent. to be occupied by other gasses, and as the air contains 80 per cent. useless nitrogen and 20 per cent. of oxygen, it follows that in a mixture of nitrous oxid and air the percentages would be 80 per cent. nitrous oxid, 16 per cent. useless nitrogen and 4 per cent. oxygen. Sometimes 80 per cent. nitrous oxid proves insufficient for relaxation and then the available oxygen must be crowded down to 3 or even 2 per cent. This necessitated very short operative procedures, since at least 10, 15 or 20 per cent. of oxygen is necessary to support life for any length of time. Andrews' suggestion was, therefore, a great step in advance in the use of nitrous oxid anesthesia, for then the mixture became 80 to 90 per cent. nitrous oxid and 20 to 10 per cent oxygen, and the method became available for continuous use and larger operations.

RESULTS OF ASPHYXIA AND CYANOSIS

Many of the accidents and objections to the use of nitrous oxid arise from the bad effects noted from the cyanosis of insufficient oxygenation. It is not necessary to go into a detailed description of asphyxia; suffice it to say that during asphyxia the respiratory and cardiac rates are increased, the blood pressure is elevated, there is deep cyanosis, rigidity of the voluntary muscles, spasmodic jerking movements (jactitation) and dilatation of the pupils. Treatment of asphyxia is the immediate administration of oxygen; for if asphyxia remains untreated death rapidly ensues. However, momentary asphyxial nitrous oxid anesthesia of the type used for very short operations, when oxygen is at hand for re-oxygenation, has been proven to be *comparatively safe*, and it is the prolonged state of *slight cyanosis* which gives the really damaging results. Morse demonstrates—"a direct relationship between the frequency and severity of postanesthetic vomiting and headaches, with the amount

*Read by proxy during the Joint Meeting of the Canadian, Interstate and New York Anesthetists with the Ontario Medical Association.

of cyanosis present during the operation. The *duration* of the cyanosis seems to be more a striking factor than the *intensity*, for *transient cyanosis*, though quite marked, was not succeeded by these sequelae, while low grades of *slight duskiness*, *prolonged*, gave evidence of post-anesthetic acidosis."

Aside from this is the problem of damage to the heart muscle from an insufficient supply of oxygen.

SAFE ZONES OF NITROUS OXID ANESTHESIA IN RELATION TO OXYGEN PERCENTAGES

The question then arises—*What is the percentage of oxygen in the mixture of nitrous oxid and oxygen that is safe for anesthesia?* A search was made through the literature for statements concerning the *percentage of oxygen need* and these varied from 2 to 20 per cent. of oxygen. However, the calibrations on most machines are incorrect for absolute percentages, so that the wide range of figures cannot be relied on nor the low recorded percentages be wholly condemned. It was not until Karl Connell, by means of the anesthesiometer, perfected the mechanical difficulties of recording gas delivery that a definite table of nitrous oxid-oxygen percentages, with the results of varying mixtures, could be worked out. He found that any mixture less than 92 per cent. nitrous oxid and 8 per cent. oxygen was extremely dangerous and was useful only for momentary procedures, but even for this its use was condemned. He found the mixture 92 per cent. nitrous oxid and 8 per cent. oxygen satisfactory for *induction only*. The zone recommended for abdominal surgery had the mixture of 89 per cent. nitrous oxid and 11 per cent. oxygen, in which zone the color of the patient was faintly cyanotic. The zone for surface surgery was 86 to 84 per cent. of nitrous oxid and 14 to 16 per cent. oxygen, in which the color was normal. This zone, with the addition of a slight amount of ether when necessary, in suitable cases, is recommended as best for all work, including abdominal surgery. A mixture of 80 per cent. nitrous oxid and 20 per cent. oxygen gives a subconscious analgesia suitable for obstetrics.

INDICATIONS FOR INCREASED OXYGEN NEED

Now various conditions in individual patients arise to upset the minute regulation of gas-oxygen proportions. It was the experience of Marshall and Cannon, in war surgery, that patients operated on following severe loss of blood, or during shock, required a much greater percentage of oxygen for operative safety, than did normal subjects. With this as a basis, W. I. Jones and Clayton McPeck conducted researches on guinea pigs, using nitrous oxid-oxygen anesthesia; and after determining the proper and safe degree of oxygenation in a normal set of pigs, and plotting the gas-oxygen percentage curves, the pigs were exsanguinated to varying degrees and then reanesthetized to determine the new oxygen need. In their

preliminary report they state that they then found that the same proportion of gases, safe in normal animals, was dangerous and fatal to those exsanguinated. In fact it was possible to determine by the reaction of the exsanguinated pigs that a blood loss of 20 per cent. demanded 3 to 4 times the amount of oxygen of normal pigs. This, therefore, is a very definite indication for using increased oxygenation with nitrous oxid, in the presence of recent hemorrhage.

Karl Connell had previously stated that any altered capacity of the blood to transfer oxygen, either in decreased rate of blood flow, or diminished hemoglobin content, would upset his charted table of zones, and that persons with reduced hemoglobin, septic conditions, excessive or rapidly increasing weight, and growing children demanded a greater percentage of oxygen in gas-oxygen anesthesia. He stated also that the percentage of oxygen need is approximately in direct ratio to the degree of anemia present and that a patient with a 50 per cent. hemoglobin index requires, for the zone of light anesthesia, 18 to 20 per cent. oxygen instead of 11 per cent. required by a normal individual.

During the war some very interesting investigations were carried on at the Mineola Flying Field, concerning the oxygen need of men who were candidates for the aviation service. The response of the aviator to a decreasing supply of oxygen was tested by experiments lasting from 25 to 145 minutes. Three methods of oxygen variation were employed. *First*—A chamber was constructed in which it was possible to reduce the barometric pressure and thus duplicate the pressures and oxygen tensions of varying heights in the air. *Second*—A rebreathing machine was used, (with stationary barometric pressure of sea level,) which started out with ordinary air, but gradually with the rebreathing, the oxygen content was decreased and the carbon dioxid was absorbed with caustic potash. *Third*—Respired air was diluted with increasing amounts of nitrogen. The results obtained from the three methods of oxygen variation were the same, proving that the barometric pressure of high altitudes is not the causative factor in mountain sickness, but that the difficulties in breathing, rapid pulse rate, headache, cyanosis and syncope are due to the diminished oxygen tensions of high elevations. As the oxygen in the air inhaled from the apparatus was reduced, the man was thereby virtually elevated to a corresponding altitude. Thus a mixture containing 20 per cent. oxygen has a barometric of 760 and the altitude is sea level. When the oxygen percentage is reduced to 17.9 per cent. it equals that of an elevation of 4,000 feet and a barometric pressure of 651. Similarly

Oxygen Percentages	Altitudes	Barometric Pressures
15.9	7,000	579
14.2	10,000	516
13.2	12,000	478
12.2	14,000	444
11.3	16,000	412
10.0	19,000	368
6.4	30,000	230

As the oxygen percentages were decreased almost the same symptoms were noted in these men as are noted by anesthetists when the oxygen content becomes insufficient during anesthesia, that is, an increase in respiratory volume and rate, an increase in pulse rate, an elevation in blood pressure and the appearance of cyanosis. There is headache and nausea and the counterpart of this we have in gas-oxygen anesthesia, as the post-anesthetic headache and vomiting noted in cases that have been somewhat cyanosed during the larger part of the anesthesia.

In the aviator tests, some men compensated so easily and so well that they stood, for brief intervals, as low as 6 per cent. oxygen or an altitude of 31,000 feet, which is higher than any heavier-than-air flying machine has ever reached. Other men failed to compensate at all, or did so poorly, and, therefore, could not endure even the slight oxygen deficiency of moderate altitudes.

BODILY REACTION TO VARIOUS OXYGEN TENSIONS

The respiratory and cardiac centers are ordinarily stimulated by about the same fall in oxygen pressure. In some subjects the first response began at an oxygen percentage of 17.9 per cent.; while the majority showed the first response between 15.5 to 16.5 per cent. This, therefore, means that the average individual, when the oxygen content of the inspired mixture becomes less than 15 per cent., must necessarily put out some effort to keep metabolic processes at the proper level, and it would seem that low-oxygen percentages under anesthesia would be very similar to low-oxygen percentages at high altitudes. We then have the following problem to consider—Is the patient in question, under anesthesia, able to stand the necessary increase in pulse rate, respiratory rate, and blood pressure elevation? Also is this particular patient one of those who would react well in the aviator tests?—For there were three very definite types of reaction to the tests made.

The optimum type showed no response until the oxygen reduced reached about 15 per cent., then there was a gradual increase in pulse, respiration and blood pressure until 7 to 6 per cent. oxygen was reached, when the blood pressure, pulse and respiration started to drop and the patients fainted, with rapid recovery following administration of oxygen.

The second type showed response at 17.9 per cent. oxygen and the compensatory reactions were excessive, pulse, respirations and blood pressure went very high and collapse came at 9 to 8 per cent. oxygen, with a much longer time required to recover and with severe headache for sometime thereafter.

A third type is seen in elderly people, in whom there may be practically no response, no rise in blood pressure, very little rise in pulse rate and respiratory rate. The compensatory mechanism seems to be entirely overwhelmed. The counterpart to this type is seen in patients who are unable to have ether added to the gas-oxygen mixture for relaxation; these patients may become cyanosed in an effort to keep them relaxed sufficiently for operative work and then, although there is cyanosis, there may be no change in pulse, respiration and blood pressure. These patients may then show post-operative myocarditis, due to the fact of the insufficient amount of oxygen supplied the heart muscle during the operation.

From the foregoing it can be seen that no person tested was able to stand an oxygen tension of less than 15 per cent. without the occurrence of certain definite compensatory reactions. This might be directly applied to gas-oxygen anesthesia, to the effect that no patient should receive less than 15 per cent. oxygen, unless the condition of his heart allowed him to be placed in the optimum class already mentioned, and that no patient with any symptoms of cardio-respiratory strain should be given less than 18 per cent. oxygen, and that such a patient would be better off if a small amount of ether were given instead for relaxation.

OXYGEN PERCENTAGES IN ARTERIAL AND VENOUS BLOOD.

[In 1893, some experiments were performed on rabbits and dogs under anesthesia by Oliver and Garrett; blood was taken and tested for the gaseous content. One animal was given pure nitrous oxid without oxygen, and blood was withdrawn during deep cyanosis. The analysis showed

	Before inhalation	After inhalation
Carbon dioxid	34.3 per cent.	15.66 per cent.
Oxygen	22.0 per cent.	3.49 per cent.
Nitrogen	1.8 per cent.	11.23 per cent.
Nitrous oxid		22.49 per cent.

This experiment was the only one of its type found in a very careful search of the literature.

Lundsgaard, and afterward Stadie, worked out the oxygen percentages in venous and arterial blood in cyanosed and uncyanosed individuals. But to our knowledge no one has worked out these under varying percentages of oxygen intake during anesthesia. Lundsgaard collected venous blood and analyzed it (1) as to its total oxygen combining capacity and (2) for the actual amount of

oxygen present in the sample. The difference between the two he termed the oxygen unsaturation. The extent of oxygen unsaturation in venous blood of normal individuals averaged 5.7 cc. of oxygen per 100 cc. of blood. He then examined a series of patients with decompensated hearts, the unsaturation here averaged 12.4 cc. per 100 cc. of blood. With a return to compensation he found the oxygen unsaturation again within normal limits. Stadie found the venous oxygen unsaturation in cyanosed pneumonia patients to be 10.0cc. of oxygen per 100 cc. of blood. He found that in normal individuals there was an unsaturation of 1.1 cc. of oxygen to 100 cc. of arterial blood and in cyanosed individuals 5.6 cc. of oxygen unsaturation per 100 cc. of arterial blood.

AUTHORS' EXPERIMENTS

With this experimental work before us we thought that the same line of investigation could be carried out under anesthesia, with blood oxygen determinations to indicate what the degree of oxygen unsaturation is under varying percentages of oxygen intake.

Our proposed experimental investigation is to anesthetize dogs with nitrous oxid and varying percentages of oxygen, to find the percentage of oxygen which first calls upon the compensatory mechanism of the animal. This will be done by Kymographic records of pulse, respiratory rate and blood pressure. We will then repeat the experiments using rebreathing, and thus determine what change in oxygen percentage is necessary in the presence of carbon dioxid and then to repeat a third time on exsanguinated dogs to determine the oxygen needs of low hemoglobin. It is proposed to take samples of blood, in all of the three types of experiments, at varying levels of oxygen intake percentages to determine the degree of oxygen unsaturation in the blood under anesthesia, without cyanosis and with slight, moderate and intense cyanosis. The results of these experiments will be reported on later.

CONCLUSION

As a matter of practice anesthetists ordinarily use the color of the patient's cheek, forehead and finger nails as the guide to the safety of anesthesia, but Lundsgaard found that a considerable degree of oxygen unsaturation in the blood may be present without showing as cyanosis. He also found that hemoglobin was less than 35 per cent. Thus the color index, unchecked by other tests of the patient's condition, is not a safe guide in gas-oxygen anesthesia. Also it would seem that an accurate means of gas delivery with an oxygen percentage seldom less than 15 per cent, is much to be preferred to the more or less haphazard methods of nitrous oxid-oxygen administration usually employed.

PRESIDENT'S ADDRESS*

BY GEORGE L. POWERS, D.D.S., MEMPHIS, TENN.

IN THE CONDUCT of the welfare of your Association during the year culminating in this wonderful program in which you are to participate, our official administration keenly feels its obligation toward you for your individual and collective co-operation, council and sincere efforts for whatever we have accomplished during the year or may accomplish during this meeting. May I, with great pleasure, express to each of you, and especially to the officers, chairmen and members of the committees, my most sincere and appreciative thanks and commendation for their faithful, alert and effective service to the profession and loyalty to the administration? Upon all occasions you have acted promptly and intelligently in response to every request I have made. All along the line we have had absolute co-operation, voluntary suggestions, no friction, good fellowship and sacrificing service concentrated for the projection of better professional and public conditions. Personally, this year's administration has been one of the bright periods of my life, and again I love and thank each one for what he has done in the cause and assure you it has been a pleasure and inspiration to have had the opportunity of being in the service with you.

PIONEER DENTISTRY

As a profession we have had an unprecedented growth. Early professional history indicates to us the crudeness of those at that time, yet the earnestness, the honesty, the intent of purpose with which those Pioneers of Dentistry labored. They pressed onward, upward, forward and many great men were they. The Dental Profession has forged ahead, year by year, by its toil of service, study and research, and splendid conceptions. Our predecessors gave to the profession all they knew. Their experiences, their pioneer surveys and their achievements have all been handed down to you and to me. Through all the years of heroic efforts, hardships and establishment of standards they functioned to ultimately bring to us their findings that we might have the advantage of their labors from which we should receive invaluable advantages. To our predecessors and professional pioneers we owe a great obligation—more than many of the men in the profession ever satisfy. They lived, served and died that Dentistry might be ultimately, effectively standardized in the mission to prevent and relieve suffering humanity and add years of health, efficiency and happiness to life through its service. Even at that time the conceptions and standards as laid down to us

*Read before the Tennessee State Dental Association, May, 1922.

were high and exacting, consequently we should, having this well laid foundation, extend our profession and ourselves to a much greater distance than did our predecessors. At our very inception into Dentistry we owed the profession a great consideration for all we received through presentation from others. May this be one thing we shall not overlook or forget.

MODERN FIELD OF DENTISTRY

Comparatively speaking, Dentistry is a young profession. Within the life of men now living it came into most of all that is worth while from a "present day practice" standpoint. Without any fear of an attempt at contradiction we make the statement that dentistry has made the most rapid strides of any profession extant. I sincerely believe that Dentistry practiced to its fullest intelligence and application is doing more to add years of life and relief to humanity than any other profession looking toward physical welfare. Contrast Dentistry even twenty years ago with the demonstrations and teachings of this great meeting at this present day in every field of the science and you will be amazed at what has been accomplished and wonder what the future may produce. The importance of skillful dental attention has really been appreciated only within the past few years. Formerly, the prevalent conception of Dentistry was solely that of a mechanical art, but to-day there has been a great shift from that conception. The profession of Medicine is greatly dependent upon Dentistry in the fact that there are human conditions which baffle all efforts of medical science and surgery until oral infections are removed. Much surgery of the face and jaws would be useless without the services of the Dental Surgeons, and in the late war plastic facial and oral surgery would have failed without the aid of Dentistry.

FUTURE DENTAL FIELD

The field for the relief of humanity and the projection of dentistry is incomparable and its progress is astounding. Our professional opportunities are wonderful; yet our responsibilities are co-extensive. We each owe the profession that we reach the highest conceptions and standards possible to attain by each day striving to be better equipped for our service. The Doctor of Dentistry of yesterday who saw nothing in the mouth but teeth, or an opportunity for placing artificial teeth, has been forced to give way to the Dental Scientist who has eliminated the tooth as the unit of dental practice and has established the inter-relation and inter-dependence of all dental conditions and operations with general physical conditions.

Discovery by the laity that defective, infective teeth are the cause of serious and fatal diseases has resulted in a general demand for more standardized Dentistry. As more people become informed, through various sources, they will relegate the "patch service dentist"

into total elimination. There is now, and will be much more in the future, a great drift toward preventive dentistry, modern therapeutics and surgery which takes into consideration the effect of Dental and Oral Diseases upon the general organism. Much attention will be given to the subject of diet as a dental application in the adding of years of life to individuals. With these realizations we must consider the truly scientific Doctor of Dentistry as a man with a workable knowledge of physical diagnosis and treatments based upon a foundation of knowledge of pathology.

The day is here when the service of dentists will not be confined within their offices for those who are physically able to come for treatment. He will be called to hospitals and the homes of sick ones, working in full co-operation with the physician, giving service with his special skill in those afflictions which are traceable to dental and oral lesions. This association of dentists and physicians produces results beneficial to patients who formerly were deprived of this co-operative concerted service, necessitating submission to the two professionals working upon him alone and unassisted.

When it comes to the matter of teeth and their possible, or positive, relation to systemic disorders, and the elimination of foci of infection, the Doctor of Dentistry shall be the sole judge, using his common sense and not permit any dictation, or demand upon his own judgment. Many thousands of the poor, helpless, edentulous-mouthed people are so because some radical dentist used poor judgment, or because a spineless dentist allowed someone else—possibly a physician—to over-ride or encroach upon his better judgment. *You are the sole and only judge of indications, conditions, and treatments of patients coming under your care, and no other living human being has a right to form your diagnosis.* I am sure you who hear me are your own judge, but just possibly there may be men in the profession who need a little “cranking up” along this line. I hope not. Be your own judge and let your conscience be your guide.

DENTAL EDUCATION

Dental education has, from a very crude method and equipment, advanced steadily with the increased demands of the public and the profession until at present our education is recognized throughout the world as being the best. Preliminary educational requirements have advanced until at present the minimum is a high school diploma of fifteen units, or its equivalent. Some schools are exacting in addition one to two years college work. All dental colleges have been classed as A—B—C. There seems no demand, at present, for increased preliminary requirements, notwithstanding the fact that all too many graduates are lacking in fundamental training as evidenced by bad spelling, writing, thought and construction. Even should the entrance requirements be raised, that would not

necessarily indicate the production of better-taught dentists. Many high school graduates have failed to get teaching in some dental schools commensurate with their rank. Some schools would do well to strengthen their faculties, organizations and courses, rather than the advocacy of increased entrance requirements.

The schools have the opportunity and power to mould the dental student into whatever degree of conception and perfection it may have within the personnel of its faculty. The student enters college plastic, receptive, impressionable and ready to adopt standards and inspirations taught him from day to day by the faculty. Consequently, the schools have a tremendous responsibility and should establish and maintain, unwaveringly, the very highest standards and teachings possible to produce, so that when a student has completed his course he shall be so saturated and so permeated with professional knowledge and ideals that he will be an honor to the profession, to his Alma Mater, to those who have stinted and sacrificed to make his preparation possible and to himself. So, I plead that you as a profession demand that schools proposing to teach Dentistry put forth the very ablest men obtainable as a faculty, irrespective of conditions or price, or go out of business.

It is impossible for a stream to rise above the spring of its source. Correspondingly, it is difficult for a student to ever rise above the teachings, ideals, inspirations and visions his faculty was able to present. In the colleges, gentlemen, is where we've GOT to make competent, ethical professional men from this day. There is where conceptions and standards of our profession can be exalted. Men of faculties with low conceptions, lack of vision, lack of ability to impart instruction and inspiration can not handle dentistry-teaching positions. Sometimes I think we are too lax in these matters. Start the boys right, continue them right during training and it will be almost impossible after they leave college to jolt it out of them. During their college training is the place of all places to build the professional man and prevent any boy entering practice a "quack", a deceiving, health-wrecking advertiser, or a professional ingrate.

In 1919 our colleges produced 3,587 graduates; in 1920 they produced 906. The average loss from the dental profession annually is about 1,900. For the past three years the net shortage is about 1,500. There is one physician in this country for every 800 persons, but one dentist for every 2,500. The annual increase in population is greatly in excess proportion to the annual production of dentists. Normally there are not enough dentists to serve the present population. The agencies by which dental education of the people is carried on only serves to increase the demand for dental service and accentuate the shortage of dentists. The demand

of the public and the profession is *how can we make dentists and dentistry more available and more efficient for all people who need service?*

DENTAL ORGANIZATION

(a). State Board of Dental Examiners. The Board of Dental Examiners are the sworn representatives of the profession, the public, and the state. You as a profession make your laws for general and professional protection and promotion. Your Board representatives honestly endeavor to digest and apply the law as they find it upon the statutes, and they need your assistance and encouragement. Most everyone who infringes upon the law governing the practice of dentistry feels his case is different, and the law should be construed and applied to be so elastic that he and his case can be excused or overlooked. Let's see that the strong men go to these positions and stay there long enough to be of some constructive force. This is your organization, your official agents to guard you, your profession, and your people, and common sense calls upon you for an efficient personnel upon this Board. This is a responsible position and one in which a man can do disastrous or constructive work according to his ability and conceptions.

(b). State Society—Social and Professional. In this busy, fast age few take the time to cultivate social life. We are absorbed with the cares of home, business, profession and a struggle to keep pace with our contemporaries. The cares and complexities of life we most feel but the joys and happinesses of life we seldom, if ever, experience. Are we getting from life the best by thus neglecting the social advantages? Man is by nature a social being and demands association. Each of us is but a branch of a great human vine, and when we separate from the parent vine we wither and retrograde into a failure in life. Man's power comes from the great heart throbs of humanity. Isolation will bring stagnation and death. The record of history is that even intellectual giants, cut off from the main society, gradually deteriorate. When God created, he said, "It is not good for man to be alone", and these words imply two factors in human life—happiness and wisdom. By companionship and communication there is an acquirement of intellectual wealth and a varied mental food which produces strength and power. We, perhaps, do not fully appreciate the part of human achievement produced by the influence of friends working upon and for us. Have we not felt inspired to higher professional lives by coming in contact with our brother practitioner? They seem to unfold within us powers we did not suspect. There seems to be an unexplainable force and power gained by social and professional intercourse with our fellow servants. The practitioner with a spirit of isolation is to be pitied for the responsibility he is assuming. Let's

give our associates a heart of love, a hand of help, a word of cheer, a tear of sympathy, and a constructive thought.

"If all my life I search for gain,
Keep busy filling my stores for days of rain,
And think my lot secure,
I'll wake to find in after days that moth and rust
Have left me only worthless dust
Of things that can't endure.
But if through pain and dimming tears
I forget my own in the round of toiling years,
And a hand to others freely give,
To those who trudge life's long, weary way,
Help bear their burdens day by day,
'Twill be a joy for me to live".

The professionally indifferent man is an inexcusable man and is reaping deterioration as a reward. He who shuts himself away from his brother practitioners and mediums of modern learning, neglects his ideals, deprives his patients of better service, and treats himself, his profession and his fellow dentists unfairly.

In the main there are three ways of securing dental information. First, through the colleges; second, the societies; and third, the journals and text books. Having finished college, every man, as he enters practice owes to himself and all else that he associates himself with his Local, State and National Societies. To hold aloof from the professional organizations through which the stream of organic dental knowledge flows is a monumental blunder for any man to make. There is no other way whereby we can receive this instruction except through the Society, and not one of us can properly function without its telling influences.

Not a man in the dental profession has the moral right to refuse to support the organizations of his state, and yet enjoy, even indirectly, any of its fruits. Everything the profession has accomplished for itself and for the public has been solely through its organizations for better efficiency and service. The Dental Society is the greatest existing agent productive of growth of the dentist. We should have the solid support of every man of worth in this state and the welfare of all concerned demands that every good man in the profession be enrolled. So, somehow let's extend the confines of this Society so that it will include all it should, that we may be better equipped for service to our people and have a more worthy organization looking toward the conservation and projection of public and professional welfare—adding years to useful and forceful life.

Looking toward the fulfillment of this view I recommend that the state be organized into Component District Dental Societies, co-extensive with Congressional Districts. May I urge this be adopted

at this meeting and that such organizations be effected as early following as practicable. Furthermore, that a committee of three, one from each of the grand divisions of the state, be appointed by the president of this meeting to perfect said plans and that sufficient funds from the Society's treasury be used to establish such organizations. Furthermore, I wish to recommend that it be the set policy of the State Association to so rotate its annual meetings that the Society shall meet in Middle Tennessee, then East Tennessee, then Middle Tennessee, then West Tennessee, then again Middle Tennessee, etc.

DENTISTS

As a dental practitioner, what are your standards? Where do you rank? Where were you yesterday and where will you be tomorrow? What is your attitude toward your brother practitioner? How did you find the profession when you entered it and how do you find it now? Has it improved and have you done anything toward the improvement? The main question is—while you are in it and when you leave it—can it be said that the profession, because of your contributions and activities, was made better? Will your profession be uplifted because you were a member of it or will it be lowered? All too many of us seemingly endeavor to criticise those who try to do things. We seem to delight in criticising and picking others to pieces. From this day may we all have sense enough to know that it is bad policy for any of us to knock our fellow practitioners. That thing will boomerang us in so many different ways that it is entirely too dangerous to ever think of using. Much better is it to speak kindly of our comrades and at least say no hurtful thing of them. If we criticise our associate to the public they usually take it to mean the one doing the criticising is jealous and envious, and the one criticised is superior, and thus you only advertise the other man and hurt your standing with the ones to whom you talk. Rather let us endorse, advise with, join forces with our brother looking toward better professional and community interests. Help our brother. Make him bigger and better and he will help us, and the public will endorse both together with the profession of dentistry, to a higher degree.

Give your soul room to grow by putting out some of the good in you toward filling others' lives with cheering words, while their ears can hear and their hearts and lives may be made to thrill and be happy. You can never know the burdens your brother carries, but you can lighten and brighten his way, or bear him down with an increased burden. A word of expression, a slap on the back, a deed of help, many change or inspire a life and result in untold accomplishments. This is a matter we too often lose sight of, yet our responsibility runs just the same. So, won't you seek and maintain your brother's better welfare?

PERSONAL PREPARATION

Have we established the daily effort to better prepare ourselves for our service? In this day of opportunities there is no excuse for anyone to neglect to improve his store of knowledge. The profession and the public demand much of all practitioners, and if we refuse to diligently apply ourselves toward preparation we are willfully, and I might say, criminally ignoring obtainable equipment and information. We have human lives within our care and their physical future at our disposal. By lack of acceptable information, failure to reasonably equip our faculties, we cannot escape being charged with the moral responsibility of possible failure in health and death, directly or indirectly. The discrepancy between health, efficiency, and added years of life and happiness, to ill health, incapacity and possible destruction, is a long, long way; yet, should the latter conditions be caused by ignorance upon the part of the one in charge, how can he escape, at the judgment bar of God, the responsibility and penalty? What shall our answer be at the final judgment, "Did you prepare yourself continuously that you might serve humanity, helpless humanity, to the highest conception?" At best we are weak but added to that if we fail to avail ourselves of opportunities for more efficiency, we are staggering under a monumental responsibility and accounting.

The public, dentistry as a profession, and dentistry as individuals usually accept us, and accord to us, the positions and rank along the way which we demonstrate to their satisfaction we are competent to acceptably fulfill. Before you, before I, ever get very far we've simply got to demonstrate we can and will deliver, irrespective of any and all handicaps, the proper stuff.

VISIONS AND CONCEPTIONS

The noticeable need among dentists is a wider conception of professional life through cultural activities into a wider range of interests than mere office routine. Doctors of Dentistry should radiate different phases of life, and not drift into a one-groove division of one subject as he approaches what should be a diversified and standardized period of life. It matters not so much what interests enter into a man's life, just so they are elevating and constructive. It may be literature, music, art, agriculture, etc., which command the thought and action of the man but it not only makes a better and stronger man, but a stronger, better dentist. To concentrate upon one thing in life to the exclusion of all else tends, decidedly, to make one narrow, stale and limited. A man need not be brilliant to cultivate other interests than his profession. We must enlarge upon our breath of vision, even over what it has been in the past, that we may experience greater, better things in life for ourselves, personally, and that our profession may be broadened and have added distinc-

tion. We can accomplish whatever we set out to do if our objective is worthy. The trouble with too many is they do not aim high enough and try hard enough, being contented to go along in the line of least resistance, yet wondering why we do not attain things others do. We wonder what is the matter with the people and the profession when the fact is we need self stock-taking, reviewing the past, improving the future, and a vision.

BUSINESS DENTIST

Are you a financial success or failure? Do you save money or do you spend all you get? Upon the replies to these questions rests very largely our material comforts; our homes; the welfare of our wives; and the culture, education and development of our children. While we are active and feel we shall always be able to stay in the service is the very time for us to take heed. Just as certain as death, we are, irrespective of ages, fast approaching the period of inactivity and incapacity. Sooner or later it will come to you and to me.

Professional men have a tendency to be free spenders and stretch credit. Why won't more of us use our heads and conserve our earnings? While we can, let's resolve that we will save enough to tide us through that hard period of inactivity. Most of us make enough money but we waste it. One of the most pathetic scenes in the field of dentistry is to observe one of our members having passed through a long period of service and struggle with the problems of life to the period of inactivity, possessing no financial means upon which to exist, and absolutely dependent upon friends, charity, or the public for what little they get.

We have no assurance that we shall live long into the future, or even should we live thusly, that we would be able to work. Just think it over. Should you become incapacitated or die, what would your financial standing be? Would your wife and the chubby little hands and bodies of your dependent ones be taken care of from what you leave them, do you know just what would become of them, or just who would take care of them, or if anybody would? The public respects a man who is a business success and he can better serve the public, the profession and himself. No man can do his best if he is constantly pinched for the lack of funds for the absolute necessities of life, and nagged and hounded by debt and creditors.

Professionally our paramount efforts should be, and are, to serve humanity better, and establish in the minds of our dentists higher conceptions, and in the minds of the public confidence of trust from true merit upon our parts, rendering the best possible service to every patient. Patients should pay a fee commensurate with the service rendered. Let me urge that we adopt conceptions of better business and more systematized offices. The dentist should

consider the patient's financial interests along with his own, exacting fees in keeping with service rendered, but in no instance is there any excuse for extortionate fees. The very poorest judgment in the world is for any professional man to commercialize his specialty to the point of exorbitant fees. The people will soon adjust matters of this nature.

May we admonish that we be a loyal, efficient, progressive, serving profession, exhibiting that our endeavors are urged ever higher that the public may be better conserved in health, power and a longer and more prosperous life.

Bank of Commerce Bldg.

SYPHILIS AND THE DENTIST.*

BY TRIM HOUSTON, CORISCANA, TEXAS

(Written for The Dental Summary.)

DURING the last few years especially, we have seen occasional statements to the effect that we, as dentists, should know something of syphilis. Along with this are statements from some men to the effect that they have been in practice a number of years but have never come in contact with a case.

No doubt such have not seen a chancre or a mucous patch, but have had numbers of cases in the late secondary and in the tertiary stages, and none have known what they were dealing with.

The following recital of a few cases, seen during the last year, picked at random from an average man's practice, will illustrate this.

A thirty-year old married man, bookkeeper, came in with what he thought was an abscess on the upper, left, second bicuspid. The teeth were sound, no tartar, a pyorrhoeic condition around all; the gum tissue coarse grained, pig-skin-looking, especially on the affected side, while from the cuspid to the third molar the gum tissue was strutted, dark, reddish-brown, with the interproximal spaces breaking down.

Wasserman was positive. Twenty-four hours after a salvarsan injection improvement was seen. A second dose cleared everything up.

The man swears that he did not know that he was afflicted, so does his physician. The first baby is about two months old; the secondary manifestations are beginning to appear on the child.

A twenty-five year old widow, the poorest of the poor tenant-farmer stock, unable to work at anything, the least exertion bringing on extreme pain and swelling of the joints. The mouth was very, very foul, teeth loose, pus, serumal tartar, no decay, skin dry, dirty, scaly looking; hair stringy, mouse-colored finger nails, very short, congenitally so.

Put the patient on iodide of potassium and protoiodide of mercury. Improvement seen in two weeks, well within three months. Teeth were firm, no pus, no odor, skin clear, hair better color; does not deny that she is willing to consider another marriage. Now ten months after first treatment is able to put in a day in the field or at the wash tub, with the best of them.

An unmarried woman, nurse, about thirty years old, one of my very best friends, showed a gummatous ulcer on the cheek, with the typical fiery red color to the soft palate, with very little pain. I did not have the moral courage to tell her what it was, excused myself with the thought that she as well as the physician who was treating her throat would know. Some six months afterward—in the meantime she had had ethmoid, turbinate, and antrum trouble, as well as lost two teeth, with the certainty of losing several more within a few years—in making a routine examination, a Wasserman came positive. Some three or four treatments of salvarsan cleaned up all the trouble. The Wasserman is negative; she is gaining in flesh. Neither she nor her M. D. had the least suspicion that she was afflicted. The next time I shall try not to be such a coward.

STATIONARY LINGUAL LOOP APPLIANCES, SHOWING THEIR RANGE AND POSSIBILITIES

BY C. E. BYINGTON, D.D.S., ORTHODONTIST, CHATTANOOGA, TENN.

IN BRIEFLY GIVING REPORT of this clinic I will try to keep in mind—*first*, that the editor has a fixed value for space in his journal; *second*, that we, as dentists and specialists, are too busy to ramble through pages of effusion to procure a small kernel that should be concealed in a thin shell.

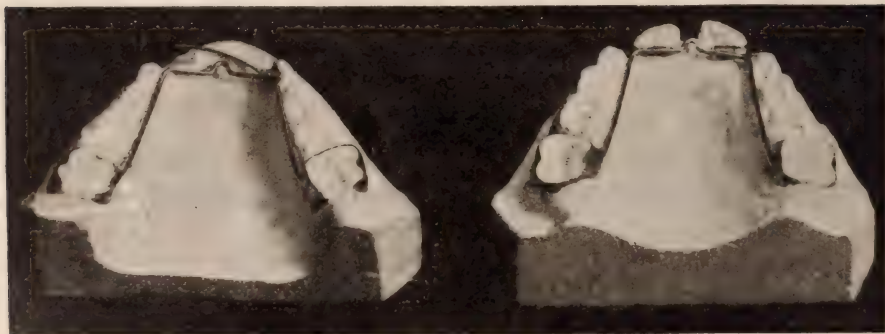


Fig. 1

To the point:—The accompanying (*Figs. 1, 2 and 3*) will reveal to you the character of appliances or principles applied (with their

modifications) in the correction of irregularities in almost every case

For the following several reasons, I adhere almost exclusively to the principle "Stationary Lingual Loop Appliance": *First*, because of the stability of the appliance; *Second*, ease of adjustment or ex-



Fig. 2

pansion; *Third*, certainty of adjustment; *Fourth*, non-conspicuousness; *Fifth*, cleanly; *Sixth*, simplicity of construction—all of which being cardinal factors and features desired in any regulating appliance.

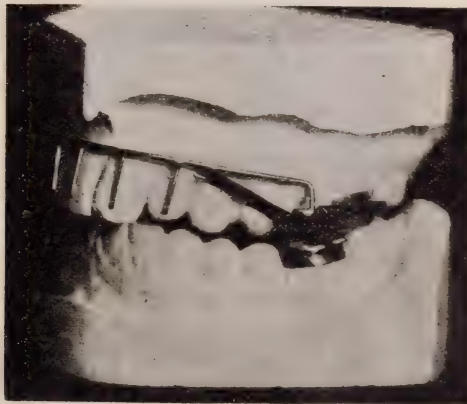


Fig. 3

BAND MATERIAL

In the stationary appliances, you should have band material about 31-gauge, rigid enough to pass between teeth without bending or springing from cement after cemented into position and tension is applied; it should be sufficiently high-fusing to take 18-karat solder to anchor bands, but never with higher than 14-karat solder for finger-springs or auxilliary wires, thereby lessening the possibility of removing spring or temper from body wire and finger-spring; band

material should be non-corrosive in character, possess proper adaptability and good edge strength.

WIRE USED

I use S. S. W. gold and platinum wire, 19-gauge for lingual loop arch and 18-gauge for base wire of the high labial arch, with 22 or 23-gauge wire for finger-spring extension. These are the most satisfactory, but being careful not to let red heat extend beyond that part of wire to be actually soldered to band or base wire. If permitted to extend beyond this point, it will have a tendency to weaken or possibly break at an anchor band, if high tension is placed.

Fig. 1 illustrates lingual wire in position and loop as it should be formed, always extending labially and not lingually; for when unfolding loop to create desired expansion by pinching in center of loop with right-angle pliers, you will get uniform expansion, if pressure is placed correctly in center of loop.

Should you reverse loop (which is wrong) you would draw anchor teeth to center of mouth unless you should pinch opposite angle of loop to compensate or off-set, but if lingual wire is intact with premolars, you get uniform expansion as loop is unfolded, and no rotation or tipping of anchor teeth will take place, if this expansion is made at intervals of 10 or 15 days.

In *Fig. 1*, you have a wide range of possibilities of this appliance with finger-spring extensions intersecting centrals, closing them as desired by bending wires, cuspids forced laterally and expanding arch, by unfolding loop, a three-fold action and all that you are seeking in this case.

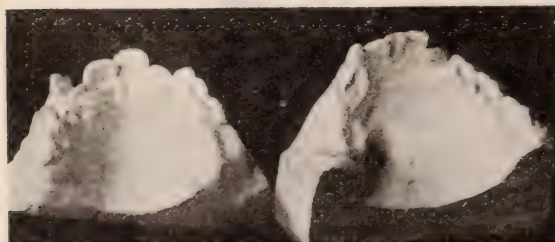


Fig. 4

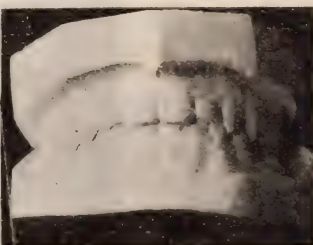


Fig. 5

In *Fig. 2* we have only a slight deviation from *Fig. 1*—a stabilizing wire 16-gauge upper, if you think the condition demands, and in the lower little spurs to intersect cuspids, making movement of these teeth more positive.

In *Fig. 3* we have nothing more than the Lourie-Dewey high labial arch appliance, but a half-round tube used to receive arch instead of round tube, which insures stability and obviates the necessity often of placing rubber bands to hold arch in position. Hook

to receive inter-maxiliary; rubber is high in this case owing to an infra-occlusion or open bite posteriorly. Ordinarily this hook should be practically parallel with cutting edge of cuspids to lessen possibility of disturbing anchor tooth below.

Owing to the lack of space, I will only give one case of "original" and "finished"—*Fig 4*. We have a mutilated case, superior left central the only tooth in correct occlusion—no space for any of the cuspids in either arch. I consider it a typical case to test the merits of this principle, and I will leave it to your own conclusion by observing *Fig. 5*, the same case finished, whether or not we have obtained reasonably good results. I give this in order to meet the argument of the fellow who might claim this method dangerous; but there is danger in the correction of any case by any method, unless the operator understands the principles applied.



Fig. 6

As a closing thought, I want to give you *Fig. 6*, and suggest that you get inexpensive wire (or silver solder will do) and form your loop with small round nose pliers; make arch to represent practical case; bend each end of wire at right angles; put them in cardboard or wood or metal as illustrated; pinch loop gently in center, then

remove only one end of wire and see what has taken place. Continue this operation many, many times, pinching and re-placing, forming new arches over and over again until you know conclusively what results you are obtaining by straightening out loop at any angle.

PLIERS USED

You can form your own pliers, the regular office or flat nose pliers bent at right angles as indicated in *Fig. 6* and they should range in size from a millimeter and one-half to three millimeters wide, beginning with the small, and using as condition indicates until loop is actually flattened or strengthened out; then if condition demands, you can sever arch wire at cuspids, form new loop and re-solder wire to take place of anterior portion of arch removed.

In conclusion:—There are no “fool-proof” appliances, but in the hands of an understanding and careful operator, satisfactory results may be obtained with almost any appliance; but to me, in the “Stationary Lingual Loop Appliance”, the results are so gratifying and construction and operation of the method so pleasing, that I suggest that you master its technic and I believe you will adopt it largely to the exclusion of other methods.

As we are about to print this issue of THE DENTAL SUMMARY, we learn of the death of the father of Dr. Wm. A. Lurie, of New Orleans, La. We assure Dr. Lurie of the sympathy of the large number of SUMMARY readers who are following closely the line of thought so ably presented by him in his Department. While the loss of friends and kin is inevitable, it is none-the-less a shock when it comes.

PENETOLOGY

Conducted by WILLIAM A. LURIE, M. D.
1130 MAISON BLANCHE BUILDING
NEW ORLEANS, LA.

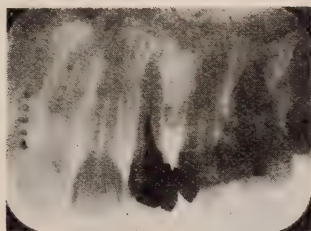
This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

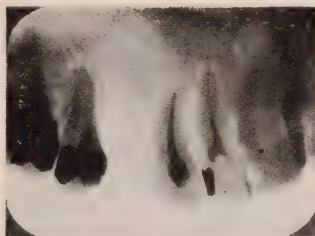
Grade 3 shadow, or the shadow appearance representing the foreign materials introduced into the dental areas as treatment or reparation of a condition, are also capable of indicating a proper or improper (simulating normal and abnormal) position or distribution. Into this classification of shadows falls everything from root canal fillings and cements to bridge work and fillings, for the purpose of restoration or replacement.

As any object has a definite outline, its shadow will have a corresponding definite outline. In the study of Grade 3 shadow

Fig. 1



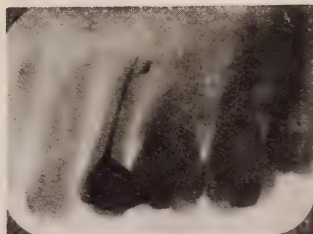
A



B



C



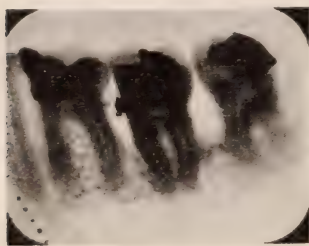
D

we are perhaps more truly studying the shadow picture of a penetographically impenetrable body, (therefore its outline only,) than we are in the study of any of the grades of shadow as they appear

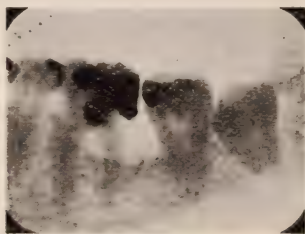
in dental penetography. The relation therefore of size, shape and position in reference to the other grades of shadows which are seen, is a most important factor.

To note size as a register of perfectness in penetographic appearance of shadow of Grade 3 one has but to refer to the shadow of root canal fillings to prove that size is an important diagnostic interpretation. In (*Fig. 1*) there are pictured a variety of root canal fillings. It is left to your own judgment which of these fillings is perfect. The principal however of a root canal filling which is intended to replace a removed pulp is that the root canal after being cleared of its contents is refilled and sealed with the root canal material during the operation. In A of (*Fig. 1*) the lack of complete filling is easily apparent. In B the difference is seen in fillings, both of which are apparently of proper length, yet one serving its purpose of obliteration of space and the other deficient in that respect. In C the fact that root canals are not always as straight as they appear to be, even in pictures, is shown in the difference in position and direction taken by a root canal filling and a very likely straight post or pin in a root. In this picture also can be seen an imperfect filling and an air space between the filling and a broken-off pin in the root canal. D shows a rather perfect filling.

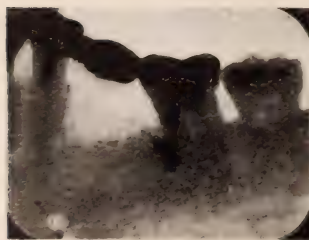
Fig. 2



A



B



C



D

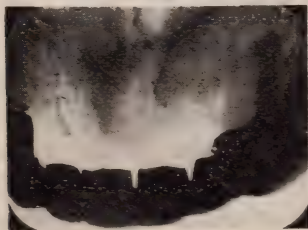
In studying root canals, that is filled root canals, the purpose of which has been to replace the soft tissue of the pulp, the perfection or imperfection of such a filling is judged by its relation to the

surrounding shadow as well as its size and length. Pulp tissue is shadow of Grade 1. In a perfectly-filled root canal there should be no Grade 1 shadow visible within a tooth (shadow Grade 2b). The root canal filling (grade 3) should meet tooth structure (grade 2 B) without any space remaining. That is to say that grade 3 shadow should be in contact with Grade 2b shadow as seen in D of (*Fig. 1*) and not as pictured in the lateral incisor of B, (*Fig. 1*).

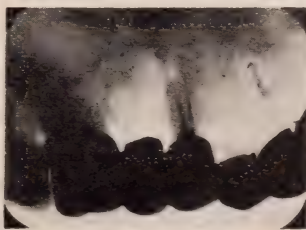
Shape of shadow of the type of foreign material represented in Grade 3 is also important from the diagnostic point of view. As a root canal filling of course this is governed entirely by the shape of the root canal which is to be filled. In a bridge or filling it depends upon the replacement or restoration which is to be made.

In A of (*Fig. 2*) the mesial surface of the crown of the second molar does not present the shape of a molar crown, and the irregularity to be noted is distinctly in shadow of Grade 3 and connected with the balance of the shadow of that grade visible in that tooth. In B (*Fig. 2*) the shape of the filling distally in the first molar does not conform to the shape of a tooth crown such as it is supposed to restore. In C of (*Fig. 2*) the shape of the mass of shadow of grade 3 in the mesial root of the molar is not typical of a periapical capping. The shadow appears as an irregularly-shaped mass mesially of the apex of the root. In D (*Fig. 2*) the post on the restoration proved too long and not at the proper angle. The effect is distinctly visible in a perforation of the distal wall of the lateral tooth. The shape therefore of shadow of the character of Grade 3 is important. From it one can learn if a proper occlusal surface has been constructed as well as if the restoration has left a smooth interproximal contact. As a filling material, either in a root canal or in the crown of a tooth,

Fig. 3



A



B

or to restore an angle, the relation of shadow of Grade 3 to the surrounding shadow must be considered, as well as the size and shape of shadow. Within a root canal this grade of shadow bears a distinct relation to the walls of the tooth root, while as a restoration it is in relation to tooth structure and surrounding teeth both as to size and shape. As a restoration the filling, expressed in shadow of Grade

3, should bear the same relation to the restored tooth and to the surrounding teeth, gingivae and alveolar process, that the carious area or the replaced area did. Should there be a discrepancy in either size or shape, the possibility of subsequent development of other condition because of such a change or alteration from the normal must be considered.

The position in which shadow of Grade 3 is found in connection with its size and shape is often diagnostic in its interpretation. Due to its distinctive appearance, the finding of grade 3 shadow in positions other than as a root-canal filling or bridge or restoration requires special attention.

The possibilities as to how and where one may encounter foreign material and under what conditions are too great to mention. However the several cases illustrated are worth study. (*Fig. 3*) pictures two views of the same case. In this case the patient reported having trouble with her gums after the extraction of her teeth and the wearing of her bridge. Her greatest trouble was in the position mesial to the bicuspid (premolar) abutment. In this position the gingiva was spongy, very red, bled easily and on pressure pus could be expressed. The possibility of a necrotic portion of alveolar process or fragment of root was considered but the diagnosis was determined from the penetograms which disclosed a portion of root-

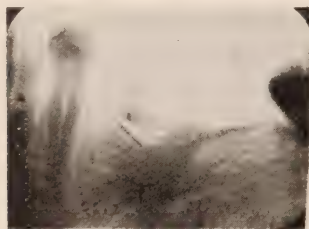


Fig. 4



Fig. 5

canal filling material in the position of the extracted lateral. The position of shadow within Grade 3 having the shape of a root canal filling, surrounded by Grade 1 shadow within Grade 2a shadow made the diagnosis of a foreign substance as the irritant. The fact that there was no shadow of Grade 2b of characteristic shape surrounding the foreign substance proved that it was not a broken root. The consistency of the shadow, that is denser than alveolar shadow, characterized it as foreign matter. The penetographic diagnosis was confirmed on operation, at which time a portion of gutta-percha root canal point was recovered. The area was well curetted and the patient made a rapid and complete recovery.

A little to the left of the center of this picture (*Fig. 4*) there can be noted a short almost straight line of about three-sixteenths of an

inch in extent composed of Grade 3 shadow. Just above this shadow there is some shadow of grade 1 to be seen and above it a rather indistinct outline of tooth root expressed in Grade 2b shadow. Comparing that shadow of Grade 3 with that described in the preceding pictures, it is straighter and denser. That is, it is of deeper color, denoting less penetration and greater resistance than the matter pictured in (*Fig. 3*). This foreign substance proved to be a portion of hypodermic needle which broke off during the injection for the removal of the portion of root.

Careful study of (*Fig. 5*) discloses an irregularly shaped mass of Grade 3 shadow within alveolar area (Grade 2b) yet distinctly surrounded by shadow of soft tissue (Grade 1) penetrability. This case presents a history worth considering.

Miss A. L., 38 years old, was a dancing teacher who had enjoyed good health up to several months before presenting herself for examination. Of late she had experienced some pain in the sacro-iliac regions and down the left leg. While not severe, these pains were discomforting and led her to seek medical advice. At about this same time the patient noticed that sudden turning of the head caused some dizziness. The dizziness increased to such an extent that it interfered with her dancing. General examination was otherwise negative, and examination of the teeth resulted in the finding of the above in the position of the left lateral incisor. On inquiry the following history was given of this tooth. While horseback riding when 18 was thrown from her mount and among other injuries knocked the upper left lateral tooth loose. After considerable treatment an abscess developed about the apex. This was opened and drained. The pulp chamber and root canal were opened and cleaned out. For two years this area continued to abscess and heal alternately when it was decided to inject the fistula with bismuth paste. Shortly after the injection the area healed over and remained healed.

In this case it is interesting to note that there is visible an irregular shaped area of Grade 3 shadow, which is surrounded by a distinct area of Grade 1 shadow, through which may be seen the roots of teeth as expressed in Grade 2b shadow. Within this area mostly all the alveolar shadow as expressed in Grade 2a has disappeared.

The diagnosis of irritation about a foreign mass was made. On resection the bismuth mass, which was found imbedded in a granular tissue, was removed. The patient made a remarkable and rapid recovery. This is six years ago and there has been no return of any symptoms of sacral pain nor of dizziness.

These cases are but a few which could be presented in illustrations of how the interpretation of shadows by grades, determining their

size, shape and position in relation to anatomically fixed points, may aid or make a diagnosis.

PENETOIZED PARAGRAPHS

What is Penetology and what is its place in medicine and dentistry? is a frequently discussed subject. This branch of science and its application was accidentally discovered by William Conrad Roentgen. Since his announcement of his discovery in 1895, X-Ray, as he chose to term the new art, has had many admirers. In fact in certain quarters of the earth there are many staunch admirers who do much with this wonderful power. This power has now been so well harnessed that perhaps no entity in hand of man has proven so mighty a factor in the diagnosis and treatment of diseases of mankind. The admirers of the potent and accurate powers of the X-Ray, or peneto-ray (penetology), are those who are conversant with it and its powers; nay, they are not only conversant, they are appreciative of its possibilities, and for the love of science in which they are engaged, the science of healing the sick, they strive to get the most that can be gotten out of the subject.

The discovery of a newer method of diagnosis or treatment of a condition may attract the medical world for a time; a wonderful surgical operation may share honors with the discovery of the treatment of a chronic condition; societies may disrupt or social upheavals may hold the stage for a limited time, but since its discovery there has been nothing—no one thing, which has advanced the practice of medicine or dentistry as penetology has. There has been nothing that has as consistently held first place in the minds of the thinking professional men as the subject of X-Ray or penetology.

Viewed from its various angles, all authorities do not agree on all of the possibilities of this wonderful diagnostic aid. In the hands of some there has been a greater advance along certain directions than in others. Some do not believe it helpful in one direction while again others do, and these in turn do not agree with the first.

This is no time to argue the point of which if either faction is right and which is wrong—the only appeal in these few sentences is to the effect that in one way we all err. We all know too little of penetology, its possibility as a diagnostic aid and the possibility of the peneto-ray as a therapeutic agent in our various specialties.

What are the qualities which make penetology the wonderful asset it is in medicine of today? Of these accessibility is first, then reliability, enthusiasm on the part of those conversant with it and its powers, and an actual and accurate record of conditions as they exist out of range of vision. There is no one item of diagnostic importance which has all these qualities. There is no other way that is known by which one professional man may convey to another

his idea of the condition which exists in deeper subsurface areas than through the penetogram. The sense of touch and the acuteness of vision built upon that sense, plus a knowledge of anatomy, which is individual may make one man better than the other. To him the internal appearance may suggest itself. The picture he paints however in the transmission of his ideas is tinted with his own interpretations. The penetogram is a portrayal not influenced by observations of any individual mind, but a record of the arrangement of parts as they exist. This recording is perfect and absolute.

Truthfulness uncolored and absolute is the measure of this record. It is also complete in every detail. We as humans fail however in our ability to describe or read all that is pictured. Our minds are not prepared to encompass the entire situation and to determine from it a picture in its true depth and worth. Therein we err. It is our error, not that of the penetogram. We should correct it. It will be corrected, perhaps not in our time but in the time coming. We are doing our part in the laying of the foundation for the building of this monument to science, the correct reading of the penetogram.

There are many changes which have taken place of late in consequence of the advance science is making. Many of these changes, in fact the majority of the changes of note, are in the office equipment. In the transformation that has taken place in the professional office the manufacturers have demonstrated their wisdom. They have pinned their faith on a profession. They placed their faith in the professional salesman. The money which the manufacturers have invested they have backed up with well trained and professional salesman. And they have spent money in the training of their professional men, and each time that a new product is introduced the professional salesman gets his special training in every feature,—every talking point of the article. There is small wonder that the finished product of the school of salesmanship find money in the profession. They "know their goods."

Knowing one's goods is the best asset of a salesman. The manufacturer spends large sums of money in the upkeep of his sales force. His investment is not always in the man but in what he can teach that man. He maintains an efficient teaching organization for his salesman; in ratio to the interest that the salesman shows in the newer and more advanced thought of the business, in just that ratio is his ability estimated.

It is a curious thing that a professional man is rated in exactly the same way;—and why not?—he is a professional salesman, selling his time and knowledge. The more tricks he has learned and can use in the sale of his time the better the sale and the greater the profits;—but he must "know his goods."

No modern office, nor any progressive man of science can be without an X-Ray machine or without knowledge of the X-Ray, its possibilities and its limitations. This does not mean that every operator must have his own X-Ray machine. It does mean however that a knowledge of X-Ray—the machine of this day in medicine—is a valuable asset and adds greatly in the sale of his time and services to his patient;—but—he must “know his goods.”

The man of science to sell his knowledge and to sell it with a profit, as the salesman does his, should be willing to learn and just as willing to spend his money in the learning as the manufacturer is in the teaching of his salesman. It might increase the revenue of all, should some farsighted manufacturer charge a little more for his machine, as a service charge, and ask those who buy his machine to “know their goods” before selling their services. By teaching them more than to take good pictures; to teach them what those pictures mean, the dentist in turn can sell his services at a profit to help pay for the machine he buys, by the honest delivery of service.

A Business Hint

The National Association of State Bank Supervisors in recent convention, voted unanimously the following resolution:

“That it is sense of members of this association that the public should be warned against purchase of that class of contracts known as the 3% loan contracts issued for home building. We believe this form of contract is productive of unjust inequalities among contract purchases and in many cases of absolute fraud.”

The convention was told that these companies were endangering the confidence of working people of America in all Financial institutions.

Loan companies are growing like weeds the country over. High class actuaries admit they cannot figure out positive results and that the schemes are positively misleading.

One delegate made the caustic statement “that the grade of certificate buyers’ intelligence can be gauged by the number of installments the holders actually pay” moved the convention to the resolution condemning such companies.

Commenting on the action, a delegate said that it follows that representatives of the companies failed to convince the meeting that contracts they were selling could possibly be fair—there were too many elements of uncertainty. Following states, it was said, have now refused loan companies permission to do business: Maine, Ohio, Minnesota, Nebraska, Kansas, Oklahoma, Arkansas, Georgia, Alabama, Virginia and North Carolina.

NEW PUBLICATIONS

A Text-book of Clinical Periodontia—A Study of the Causes and Pathology of, Periodontal Disease and a Consideration of its Treatment. By Paul R. Stillman, D. D. S., Instructor in Periodontia, Columbia University, New York. Past President American Academy of Periodontology, and John Oppie McCall, A. B., D. D. S., Instructor in Periodontia, Columbia University, New York; formerly Professor of Oral Hygiene and Periodontia Dental Department, University of Buffalo; Past President American Academy of Periodontology, New York. The Macmillan Company, Pub., 1922.

"The dissemination of knowledge which will assist our colleagues in the control of Periodontoclasia, furnishes the underlying motive for the publication of this book", write the authors.

They also state that to many readers this volume will represent largely a disagreement with the views expressed by many investigators of prominence. The difference of opinion does exist but it is voiced primarily because these dissonant theories have in practice failed to give satisfactory results. On the other hand, the theories which are advanced in the book, have given highly pleasing results, both in the experience of the authors and in that of many others.

In the book the reader will find frequent allusions to the subject of "traumatic occlusion", but as traumatic disturbance of function is so constantly found in the field of periodontal pathology, this is necessary to give the subject that emphasis it demands.

In presenting the chapters on Anatomy, Histology and other subjects dealing with the fundamental sciences concerned, it has been the object of the authors to link them to the clinical aspects as far as possible. The dentist should at all times be able to interpret his clinical picture in terms of histology and pathology for only thus will he be able fully to understand the conditions and be able intelligently to deal successfully with the conditions which he sees.

The subject of Diagnosis has been given a place of prominence and has been made a Section of the book in itself.

There is no short and easy way to the successful treatment of periodontal disease and one cannot hope for success in its treatment until he has mastered the many details as set forth in the text. The book contains 240 pages of text and a number of helpful illustrations.

Mouth Hygiene, a Text-book for Dental Hygienists—Compiled and Edited by Alfred C. Fones, D. D. S., Bridgeport, Conn. Second Edition, thoroughly revised—Philadelphia and New York: Lea & Febiger, 1921. Price \$5.00

In this text-book on Mouth Hygiene the author has endeavored to meet the need of the dental hygienist for those subjects which pertain directly to dentistry and which are essential to her education.

Chapter I covers the subject, Anatomy of the Head, written by Dr. R. W. Strang; Chapter II, Histology of the Teeth and Associate Structures, by Dr. Strang; Chapter III, The Teeth as a Masticating Machine, by Dr. C. R. Turner; Chapter IV, Malocclusion of the Teeth, by Dr. R. Ottolengui; Chapter V, Inflammation by Dr. Leroy M. S. Miner; Chapter VI, Deposits and Accretions upon the Teeth, by Dr. E. C. Kirk; Chapter VII, Pyorrhea Alveolaris, by Dr. A. H. Merritt; Chapter VIII, Dental Caries, by Dr. E. C. Kirk; Chapter IX, Odontalgia and Neuralgia, by Dr. A. Hopewell Smith; Chapter X, The Relation of Oral Infections to General Health, by Dr. Kurt H. Thoma; Chapter XI, Dental Prophylaxis by Dr. Alfred C. Fones.

The text is well illustrated with 218 illustrations, mainly half-tone engravings and 8 plates in color.

General Pathology and Principles of Medicine for Students and Practitioners of Dentistry. By V. C. Rowland, A. M., M. D., Associate Professor of General Pathology and Medicine, Western Reserve Dental College; Instructor in Medicine, Western Reserve Medical College, Cleveland, Ohio. Philadelphia: Lea & Febiger, 1921. Price \$3.75.

This volume has been prepared to meet the needs of a text on general pathology suitable for dental students. The author says, "a number of years of experience as a teacher of this subject has led to the conviction that a great deal of applied pathology and some clinical medicine are best included in this course. There is a tendency of late to correlate these two aspects of medical science more closely in the complex tests in pathology for medical students. For the dental students it is especially important and necessary that the subject be considered in this way".

Special emphasis has been given to the subject of oral manifestations of systemic disease. The subject of special pathology of the oral cavity and related structures occupies three chapters and the subject of focal infection has been given due consideration. The text is illustrated with 118 engravings and six colored plates.

Oral Roentgenology—A Roentgen Study of the Anatomy and Pathology of the Oral Cavity. By Kurt H. Thoma, D. M. D., Assistant Professor of Oral Histology and Pathology and member of the Research Committee, Harvard University Dental School, Oral Surgeon Robert Breck Brigham Hospital, etc. Second Edition, Revised and Enlarged. Philadelphia and New York: Lea & Febiger, Publisher, 1922. Price \$6.00.

In the preparation of this edition the text has been almost entirely rewritten, and the new terms officially adopted by the American Academy of Periodontology have been used in the section dealing with periodontal diseases.

There has been an addition inserted at the beginning of the book, giving an elementary description of Roentgen technic, special attention being paid to the methods of making exposures. This section was prepared particularly for the student and beginner, to make the volume useful as a student's text-book.

Another section is devoted to the interpretation of Roentgenograms, examples being given of errors which lead to misinterpretation.

The third part treats with the Roentgen appearance of the normal tissues of the oral cavity, giving the subject, as well as the practitioner, an opportunity to compare photographs showing the outer and inner make-up of the jaws with the Roentgen picture.

In the fourth part, the various diseases which affect the teeth and jaws are taken up according to their classification, and a large number of practical cases have been used to illustrate the various conditions.

The last section describes, principally, the use of the Roentgen ray for examination of the oral tissue for determining foci of infection in somatic disease and for investigation for causes of dental and trigeminal neuralgia. Four hundred and seventy illustrations, mostly original, are used to illustrate the text.

History of Dentistry—A Practical Treatise for the Use of Dental Students and Practitioners. By J. A. Taylor, D. D. S., Professor of Dental Jurisprudence, Ethics, Economics and History, Dental Department, Georgetown University, Washington, D. C. Philadelphia and New York. Lea & Febiger, Pub., 1922. Price \$2.75.

This book is a sort of miscellaneous collection of facts pertaining to the history and progress of dentistry, that have been compiled mainly from Guerini's most excellent history of dentistry, Koch's history and from articles that have appeared in dental magazines. In that portion of the book given to biographies of noted American dentist's, history of the subjects forming the different branches of dentistry, dental colleges and education, dental journalism, and dental associations and societies, much of importance has not been given and the book as it now appears is not as complete as a textbook on the subject should be to be of great worth.

Orthodontic Directory of America with Foreign List. Second Edition, 1922. Price \$3.00.

In this directory a list of the orthodontic societies is given, a list by states of the orthodontists of the United States, and a list of orthodontists in foreign countries. Also an alphabetical directory of orthodontists of the United States. It is well arranged and printed and a useful book for orthodontists and other dentists who may be interested. It was prepared by Dr. William C. Fisher, 501 Fifth Ave. New York.

Index of the Periodical Dental Literature published in the English Language, including sixty-eight publications in England, Scotland, Canada, Australia, New Zealand and the United States for the five years 1916-1920. A classified subject Index on the plan of the Dewey Decimal Classification. An

alphabetical author Index. A list of Dental Books published during the same period. Compiled by Arthur D. Black, A. M., M. D., D. D. S., S. D., Dean Northwestern University Dental School. Published by the Dental Index Bureau under the direction of the American Institute of Dental Teachers and under the auspices of the National Dental Association, Research Commission of the National Dental Association, British Dental Association, Canadian Dental Association, New Zealand Dental Association, Society of Dental Science, New South Wales, 1922. Price in U. S. and Canada \$6.00. Elsewhere \$6.50

This volume covering the five year period of our dental literature, 1916-1920, is the second of the series to be published; the first volume having covered the literature for 1911-1915.

In referring to the development of the Index, and its use, the editor, Dr. A. D. Black, in an introductory article in this volume, says:

"In the previous volume of the Index, covering the period of 1911-1915, attention was called to the inaccessibility of the articles in our periodical literature, which had clearly pointed out the need of an Index. With one year's use of that volume, even though limited to a five year period, we are more than ever convinced of the desirability of continuing this work until all our periodical literature shall be covered."

The Index gives us opportunity to know the development of dentistry in the past; it is of great aid to the one who wants to find out what already has been written on certain subjects; it is of value to the investigator; and aid to the writer as a reference book in libraries; and in many other ways a most useful volume. If used as it should be, every article to be hereafter published, should be a more useful article than it would have been without the Index. And the value of the Index is enhanced by the number and distribution of our libraries, and their added service to the profession by the work of abstractors. In nearly every city of large or moderate size, there is today, in the public or medical library, a fair collection of dental books and periodicals. There are also many private libraries, and the Index will stimulate the building of many more.

Another volume of the Index covering the literature from 1839 to 1880 is now in preparation and will be published next fall.

Altogether the undertaking of the preparation and publication of a complete Index to dental literature is a mammoth one and all praise is due those who have had the courage to face such a task

The edition is limited and all those who want a copy of the Index should order immediately from: Dr. Abram Hoffman, Sec'y-Treas., 381 Linwood Ave., Buffalo, N. Y.

The Newer Knowledge of Nutrition. The Use of Food for the Preservation of Vitality and Health. By E. V. McCollum, Ph. D., Sc. D., Professor of Chemical Hygiene in the School of Hygiene and Public Health, of the Johns Hopkins University, Baltimore, Md. Second edition; entirely rewritten. New York; The MacMillan Co., Pub., 1922. Price \$3 80.

In the preface to this volume the author states that in the vast literature which has grown up within a few years relating to nutrition investigations, there is much that is confusing to one who would undertake to familiarize himself with it. Faulty technic, unwarranted deductions, premature conclusions and conflicting data were inevitable in investigations involving so many variables and unknown factors. It seemed to the author that there is great need of a careful and critical interpretation of the existing data relating to nutrition, in order that the science may appear in its proper perspective. It was with this object that the present volume was written. In order that the subject might be clarified it was necessary that elements of weakness in a considerable amount of experimental data should be pointed out.

The ultimate aim of scientific investigations is to give man control over the forces of Nature. The science of nutrition gives promise of making possible the realization of the optimal condition of physical well being, with all that this implies for the mental achievement, freedom from physical defects including tooth decay, and immunity to many of the ills which result from invasion of the tissues through breeches in the barriers of bodily defense, especially through decayed teeth and a debilitated alimentary tract.

The author has, during recent years, devoted much study to the dietary habits of peoples in different parts of the world with a view to correlating the results of animal experimentation with those of human experience in the use of different

types of diets. The results of this study are presented in this volume. It is believed that these two lines of investigation, discussed as they are in their relation to each other, point unmistakably to a dietary regimen which will, when adopted, bring about marked improvement in the human race.

The subjects treated in the various chapters are as follows: The Beginning of a New Era in Nutrition Studies; A Biological Method for the Analysis of Food-stuff; Earlier Views of Nutrition Problems; The Nutritive Value of the Proteins; Peculiarities of Composition of Proteins; The Dietary Properties of Individual Food-stuffs; The Vegetarian Diet; The Dietary Deficiency Diseases; Scurvy, Beri-beri, and Polyneuritis; Chemical Nature of the Antineuritic Substance, Water-soluble B.; Xerophthalmia; Chemical Studies of the Dietary Essential, Fat-soluble A.; The Relation of Pellagra to Diet; The Relation of Diet to the Etiology of Rickets and Related Conditions; The Nursing Mother as a Factor of Safety in the Nutrition of the Suckling; New Viewpoints Relating to Practical Problems of Nutrition; The Dietary Habits of Man in Several Parts of the World; The Most Fundamental Problem in Preventive Dentistry.

The author, Dr. McCollum, is recognized as one of the greatest investigators along these lines of research and he has given in this book much of vital importance to humanity.

Bulletin No. 1.—The Defensive Diet League of America. Issued by the League for the Dissemination of Dietary Information among its members. Those interested are referred to our July issue in which was printed copious extracts from this Bulletin and an outline of the work contemplated. For copies of the Bulletin address—The Defensive Diet League of America, 2370 Glenwood Av., Toledo, Ohio.



EDITORIAL

DIET AND THE DENTIST

George Huston Bell, M.D., F.A.C.S., attending surgeon New York Eye and Ear Infirmary, visiting ophthalmologist U. S. T. H. Hospital, writing in the *Journal of Oralogy*, says:

"The time is not far distant when the progressive dentist will demand urinary reports of all patients coming to the office, and will take up the question of diet with them."

Readers of this article and others will find themselves unable to take and maintain a place with the rank and file of wide-awake dentists unless they know:

1. The fundamental principles of correct diet.
2. The protective and defensive diet that is necessary for lasting results after treatment for pyorrhea and other mouth affections, always and invariably the result of acidosis of greater or lesser severity, brought about by incorrect and destructive diet.
3. The wrong combinations of foods, or errors of diet, that result in 95%, a conservative estimate, of ALL diseases, and
4. The essentials of proper diet in health and disease, and the methods of applying other than urology tests in diagnosis.

The knowledge embraced under these headings is no longer considered only a "fad," with which a few cranks amuse themselves, but is now known and recognized as common sense of the highest order, applied to the betterment of the dentist and his patients.

A movement toward an effective and permanent organization for the dissemination of dependable information on these positively necessary and most vital subjects has been inaugurated and is gathering impetus.

Readers interested are referred to our News and Opinions pages for further information.

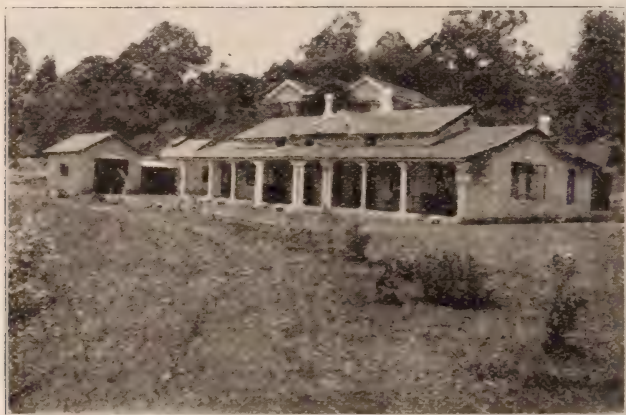
—G. E. H.

CORRESPONDENCE

Dear SUMMARY:

Your letter has been here a long time, and should have been answered long ago; but you know dentists, and you know that if they put off a thing for one day they are pretty sure to put it off for many days. (Yea, verily!)

One reason for the delay is that we have been moving into our new home. If there is one job on earth that tries out a man it is moving. I am sending with this a picture of the new house that maybe you and your readers will be interested in seeing.



If you could read the sign on one of the pillars you would see: "Hours 8-3, except Sundays." The large window on the end is my operating-room window, and the one next to that opens into my laboratory. The shed next to that is the place where my mechanic polishes plates and does other rough work of that kind. At the other end of the picture is the garage where my good "Essex" waits our pleasure.

The other picture will be interesting to all of you. This "gent" is our dhobi (washerman). The pack on his back is the soiled clothes going away to be washed. He does very good work.

[Some of these days when one of us Yanks around here is going home, I am going to send you an orchid. The only way to send it is as a part of somebody's luggage, so that it may be watered often.

These plants grow in moss and rocks, no earth, only small stones around them, and I want to send one just as the villagers bring it in, in a rustic basket.



Here is an order for a few items of R. & R. goods, burs, etc. I do not want to be without them.

Give my best regards to all my friends there, and let them know that I am prospering away out here.

Sincerely,

W. F. Rule, D.D.S.

Coonoor, So. India,
May 3, 1922.

TUSCALOOSA, ALA., JULY 12, 1922

To Whom It May Concern:

The Board of Dental Examiners of Alabama would call your attention to one of its new requirements of applicants for license certificates; effective at the annual examination, beginning June 1923 which reads as follows:

Upper, fixed, sanitary bridge will be substituted for inlay, to consist of three-quarter or hood crown on cuspid and three-quarter crown on first molar with sanitary pontics or dummies, to be waxed up in occlusion but not soldered, and to be mounted on typodont or extracted teeth properly set in plaster models and mounted on

articulator. All work including preparation of abutments, to be done before the Board, except, that if porcelain root tips are used on pontics or dummies, they must be baked before coming to the examination.

We would again call your attention to an appeal which we sent out in 1919 which reads as follows:

"This appeal is directed by the State Board of Dental Examiners of Alabama to the recognized dental colleges of the United States.

In the light of present-day knowledge, it seems to us but little short of criminal that the schools in many instances are graduating men with such a vague idea of the awful effects of focal infection resulting from improper root-canal technic.

So much secondary disease originating from focal infection makes it absolutely necessary, that if root-canal technic is to be taught at all, then the most approved, modern methods should be taught, not only in lectures, but should be practiced rigidly in the infirmary.

In this connection, it is deplorable that in many instances we find recent graduates going out mentally equipped to practice obsolete methods and we respectfully suggest that those colleges which have not already done so, will establish a chair bearing the same relation to Dental Surgery that the Chair of Current Literature bears to the Academic Course in the various colleges and universities.

With no intent to embarrass and with only the good of the public and the right of recognition of the profession in mind, this appeal is respectfully submitted."

The board has observed some improvement in the applicants which have come before it but we wish again to urge that those colleges that teach root-canal filling do so with a rigid observance of the strictest asepsis, both in the clinic and didactic departments.

Respectfully submitted,

H. Clay Hassel,

Secretary-Treasurer

Chicago Dental Society

The annual midwinter clinic of the Chicago Dental Society will be held at the Hotel Drake, January 18th, 19th and 20th, 1923.

All members of the National Dental Association are invited to attend. Ethical non-member practitioners, making application for membership at this meeting, will be admitted.

Hotel reservations should be made direct with the hotel management.

For further information, please communicate with

M. M. PRINTZ, *Secretary*

25 E. Washington St., Chicago.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

Foods and the Man

Physically we *are* what we eat—take it or leave it.

Mentally we have precisely so much and of such quality as our physical organisms will allow us to express and no more.

Spiritually we are limited by both mental and physical conditions, both of which rest upon the *kind* of cells we build from the foods we eat—take it or leave it.

Physically, mentally and spiritually, we *are*, we *have*, and we *express* just *so much* and of such quality as the foods we eat and our reaction to those foods allow and no more.

A man with a voice like a fog-horn cannot be heard above the roar of Niagara Falls. The kindest, gentlest, wisest soul that ever lived cannot make himself heard and felt, and understood, and appreciated above the roar and the tumult of cells floating, and fighting, and struggling, and dying in the toxic flood in which most of us compel them to exist by the mistakes we make in the foods we eat.

The only *true* digestion is cell digestion. The only foods our bodies ever really get is that comparatively small proportion of the foods we digest that may be converted into assimilable fluids.

If we could understand and would heed the voice with which our cells call to us in protest against the impossible messes with which we surround them, and soak them, and poison them we might some day realize how desperately important is this matter of what, when and how we eat and how our foods are prepared.

Yet the cry of our cells certainly would seem to be plain enough, simple enough, and most undoubtedly emphatic enough, when we realize the entirely obvious fact that every "symptom" of every "disease" is no more and no less than a protest on the part of some group of cells against the mistreatment they are receiving in the way of foodstuffs offered to them, most of which are habitually selected as palate-ticklers and nothing else.

As is universally true of all kinds and degrees of elemental life, our cells are very patient, very long-suffering, very much enduring. Plant a tree in unsuitable soil, amid unfavorable surroundings, give it improper food, and it will make a brave fight for

life, do its level best to take root and grow, and never give up until the last atom of food stored in its own body has been consumed. Try such an experiment. You will find that the leaves of a tree so abused will retain their color, their sprightliness, and function as best they can for many weeks, sometimes even for months; and then suddenly, sometimes almost over night, those leaves will collapse, wilt, and hang upon their stems. Pull up the tree and examine the roots. You will find them dry, brittle and dead, and that never for a minute have they taken hold of the soil, nor extracted an atom of nourishment from it. Examine the trunk further and further up, inch by inch, and you will find it in the same condition as the roots, almost up to the leaf-bearing twigs, which probably will contain a little moisture and be slightly elastic still.

So with our bodily cells. Fatalistic to the point of suicide, they will do the best they can with the foods we give them until they no longer are able to sustain life and activity, and then they too give up the fight and die. But they do not die without a vigorous protest and many insistent calls for help. They, too, draw upon their own reserves of food and vital fluids, upon supplies stored within their own bodies, until that is exhausted; and then they draw upon their neighbors, when their history becomes one of the "survival of the fittest".

When cells begin to protest, to call for help, to send out their S. O. S., symptoms of *dis-ease* begin to appear, sometimes perypheral, sometimes central, sometimes nearby, sometimes in remote parts of the body, but *always* readable, *always* coherent, always understandable, if we have the key to their cipher and will but heed their call.

Sometimes, and fortunate it is for us that this *sometimes* is very frequent, the stomach cells make such vigorous protest that the toxins with which we cram them, and flood them, get no further, and they *return* the whole mass without thanks. At other times these cells pass along everything and put it "up to" other cells to take it or leave it as best they may—and then the danger signals take other forms: colds contracted easily and frequently, that hang on persistently; tired, "all-gone feeling;" drowsiness; indisposition to exertion; first mental, then

As It Was—and Is

ANCIENT operative dentistry placed its reliance on gold. MODERN operative dentistry has found nothing to displace it.

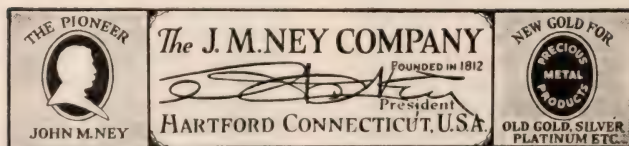
Therefore, dentistry has a tremendous stake in the nature and character of its precious metals.

It also has a tremendous stake in the nature and character of the firms making such supplies.

Modern manufacture has developed a variety of golds and gold alloys with physical properties to meet a variety of requirements.

The character of dentistry is, in a measure, governed by the character of its basic materials.

Individual reputations rest on the same basis.



"Best Since 1812"

A Suggestion.

During the
warm days
of summer,
especially
August, use

GREEN

Standard Inlay-Wax

It is a little
harder than
blue or black
and will work
excellently during
the warm weather.

TRY IT.

The Ransom & Randolph Co.
Toledo, Ohio.

physical; inability to think clearly, connectedly, logically and persistently; general "indisposition;" pimples, boils, eczema, eyes tired, hair dry and brittle, nails ditto, aching and stiffness in joints, neuritis, arthritis, all the other "itises;" dimness of vision, skin dry, lack of appetite, caries, plaques, "pyorrhea," shortness of breath, palpitation of heart, headaches, neuralgias—all the host of warnings that are sent flying and careening over the marvelous wireless system of these wonderful bodies of ours, reminding me of the story of the "Three Warnings" in the "piece" in McGuffey's old school reader, in which Farmer Dobson plays the major role. Look it up. It begins something like this:

"When sports went round and all was gay
On Farmer Dobson's wedding day.
Death called aside the jocund groom
With him into another room"—

I cannot quote further from memory, but do recall this:

"* * * * * You must, said he,
Quit your sweet bride and come with me."
"With you!" the hapless bridegroom cried;
"With you and quit my Susan's side?"

He then goes on to reproach Death for taking him unawares, without warning and says that such treatment is unfair. Death replies that he will not have it so; that he has a reputation that he must maintain; relinquishes his demand for the time, and agrees not to make his final visit until he has given his victim "Three separate warnings." And these warnings were given and of course, unheeded, until finally came the "last scene of all," when Dobson was obliged to admit that Death had kept his word.

We all have warnings in plenty, but we fail to heed them, even if we understand them. Of course, ignorance is responsible for most of our heedlessness; habit is chargeable with much of the rest; state of mind based upon the "three-score-years-and-ten" fallacy amounting almost to fatalistic superstition, has a share in it all; taken altogether, there would most certainly seem to be ample work to do.

If we can replace ignorance with intelligence; habit with rational discrimination and control of palate-appetite; superstition with knowledge and common-sense, we shall have accomplished much, and have earned the commendation of our own conscience, which is about all there is in conscious existence really worth while.

"Do what thy manhood bids thee do:
From none but self expect applause.

He noblest lives and bravest dies

Who makes—and keeps—his self made laws."

If interested I shall be glad to hear from you.—G. E. H.

A neighbor of mine, a fine woman of much more than ordinary intelligence, has an only son, a splendid boy, one of the most industrious I ever have known. In



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THERE are thousands of dentists who can see themselves in the above picture as they were in Pre-Trubyte days searching for a suitable tooth for that "particular patient" whom we all knew and whom we were all anxious to satisfy. An hour's search was not unusual.

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The time saved more than pays for the added quality and service and pleased patients are the rule rather than the exception, and we are told that pleased patients are the best practice builders.

If you haven't a Trubyte Mould Guide, ask your dealer or salesman how to get one at a nominal price. It will mean one of the best investments you have ever made.

Of course there were many pleasant meetings at the tooth counters in the old Pre-Trubyte days, but thanks to Trubyte teeth and other efficient aids, there is more time now for such meetings at the golf links, and at your Society's Conventions.

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order to get to his work on time he must rise early and leave the home about 6:30. The mother thinks everything of the boy, and will not allow him to prepare his own breakfast but rises early herself to get it ready for him. So every morning, while tinkering around among my roses and such in the back yard, my nostrils are tickled by the delicious odors of frying ham, or bacon, or chops and pancakes, or potatoes, coffee, etc. Every morning the boy has a delectable *fried* breakfast, starting the day with a stomach-full of toxin-producing, disease-inviting provender, sure to reduce his efficiency, and eventually shorten his life. In addition to the work of the day, his system is called upon to fight a host of acid toxins with which his breakfast is loaded—and some day that fight is sure to result in defeat. Nobody in this world or any other possibly could enjoy, more than I do, a breakfast of ham-and, with hot, crisp biscuits and good coffee; but I'd about as soon take poison and be done with it as to indulge my palate with more than one or two such feasts a year. If that loving mother knew what she was doing, does anybody suppose that she would continue? The things we have to fight are ignorance and prejudice more than anything else. Anybody want to help?

Dr. Percy R. Howe, of Forsyth Infirmary, is telling his audiences that caries is the result of malnutrition, and not of the fermentation of starches or anything else in the mouth. Dentists must begin to teach their patients what to eat in addition to looking after their masticatory apparatus.

The Peking, China, Union Medical College is conducted by the Rockefeller Foundation. Dr. Bert G. Anderson, St. Paul, Minn., has been appointed to the post of dental surgeon in that institution and leaves August 1, to assume his new duties.

It is estimated that a full thousand members of the Chicago Dental Society attended the National meeting at Los Angeles.

Recent Dental Elections

Dr. George L. Powers, Memphis, was re-elected president of the Tennessee State Board, June 25. Other officers elected are: John A. Gholston, Clarksville, vice-president; F. W. Meacham, Chattanooga, secretary-treasurer. The other members of the board are: H. M. A. Smith, Knoxville; W. D. Ferrell, Nashville; H. K. Templeton, Covington.

June 22, Dr. J. D. Jordon, Little Rock, was elected president of the State Board; J. R. York, Hope, vice-president; H. J. Crume, Eldorado, re-elected secretary-treasurer.

Colorado State—A. C. Withers, Denver, president; Z. T. Roberts, Rocky Ford, vice-president; H. W. Wilson, Denver, re-elected secretary; William Smedley, Denver, re-elected treasurer. Next meeting, Colorado Springs.

Potomac Valley, W. V.—Newly organized. Embraces counties of Hampshire, Grant, Pendleton, Hardy, Tucker, and Mineral. W. I. Korlz, president; H. F. Pinnell, vice-president; Ed J. O'Donnell, secretary; Wm. VanMeter, W. H. Spangler, R. L. Thacker, ex-committee. Program meetings are to be held at stated periods.

New Mexico State—C. W. Hoover, Dawson, president; H. S. Murdock, Springer, first vice-president; M. R. Chapin, Las Vegas, second vice-president; P. D. Nolting, Albuquerque, secretary-treasurer. Next meeting at Albuquerque. At the meeting ending June 29, several prominent men appeared on the program: W. Clyde Davis, Nebraska College of Dentistry; U. G. Rickert, University of Michigan; Elmer S. Best, University of Minnesota.

Wisconsin State—Dr. Adolph Gropper, who had been treasurer for twenty years, was elected president; J. J. Wright, Milwaukee, vice-president; E. M. Kapitan, Manitowoc, second vice-president; R. W. Huegel, Madison, secretary; A. E. Graebner, Milwaukee, treasurer; Roy S. Hopkins, Milwaukee, librarian.

Findlay Dental Clinic

The dental clinic has become an established department of the Findlay public schools. Started six years ago, the clinic's value has been steadily increasing until it has reached a point where it is as indispensable as any of the studies of the school curriculum might be. It has fully demonstrated its worth-while character by the improved health of the school children, who are thus placed in a position to do better school work.

The Board of Education has been asked by those in charge of the clinic to provide a somewhat larger financial outlay for the school dental work for the coming year. The increase sought is small in the light of the enlarged amount of benefit that could be accomplished with the improved facilities that are desired. Furthermore, the board might well consider favorably an increased amount of compensation for the clinic's capable and untiring supervisor, who for the first five years unselfishly yields his valuable time in the interests of the clinic's success, without remuneration.

If the additional funds can be found by the Board of Education it will be making no mistake in appropriating an increased amount for the dental clinic for 1922-23 in the Findlay schools. The money thus far expended in this work has returned rich

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dividends in the shape of healthier groups of school children. There is every reason to believe that an increased expenditure will expand the benefits in direct proportion to the extent to which the board authorizes additional facilities.—*Findlay Morning Republican*.

Graduates Licensed

Of twenty applicants examined by the Kentucky State Board at Louisville, June 14, seventeen were granted licenses.

Forty-four of 64 candidates were licensed by the Washington State Board, at Olympia, June 20.

Of a class of 99, the California State Board accepted 72, June 19.

Five white and two negroes were licensed by the Mississippi State Board, at Jackson, June 23.

The Alabama State Board licensed a class of nine at Birmingham, June 23.

As usual during the past few years, every graduate of Marquette passed the Wisconsin State Board examination, June 30, 75 in all, and were licensed to practice in that state.

Sixteen new dentists were created by the action of the North Carolina State Board, July 5.

The Tennessee State Board licensed 47 applicants, June 25, of a class of fifty. Those who failed were colored. Five of those passed were women.

As a rule, the classes were very small comparatively, due to the increase in requirements, etc., and the question continues to bob up: "What is the world going to do without dentists,"

DEATHS

At Lancaster, Ohio, June 17, of apoplexy, Dr. John Clark Scott, aged 70. Dr. Scott was probably the oldest practitioner in his section of the state, having practiced at Lancaster for fifty years without the loss of a single day on account of illness. He was a frequent contributor to dental journals.

At Waterbury, Conn., June 22, Dr. Frank L. Ryder, aged 56.

At Richmond, Va., June 21, Dr. Stewart T. Gibbs, 55.

At Greenville, Mo., June 22, Dr. E. E. Hawley, formerly of New Paris, Ohio.

At North Adams, Mass., June 27, Dr. Francis R. Rice, 73.

At Floral Park, L. I., July 5, Dr. Ellsworth T. Crilley, 39.

At Salt Lake City, Utah, June 5, Dr. Daniel F. Gurnsey, 28. He was a member of the American Legion, having seen service during the world war.

At Pasadena, Ca., June 29, Dr. Clifford Muray Roberts, 62.

DEFENSIVE DIET LEAGUE OF AMERICA

A Clearing-House for Dietary Information.

On March 11 and on May 8, I had the honor of reading a paper before the Arkansas and Tennessee State Meetings respectively, on the subject of "Diet with Relation to Mouth Diseases."

As a result of that meeting and similar work elsewhere, and in response to suggestions received from many dentists, the Defensive-Diet League of America was organized just one month ago, and already has members in six States, with indications of steady growth among dentists who realize the necessity for definite, dependable information with regard to diet, not only for the protection of themselves and their families, but also to enable them to become real health-advisers to their patients, in order that their reparative work in the mouth may have some chance of permanency. You might as well try to save a burning building by patching the roof as to expect dental operations to restore health to a patient whose body reeks with toxins as the result of improper, unbalanced diet.

Never in the history of dentistry has there been such great and really intelligent interest manifested in matters having to do with the science of eating; and never before has there been obtainable such reliable information as now. Never before have all authorities been in complete agreement concerning the fundamental principles of correct eating.

It is one of the purposes of this organization to collect, digest, condense and transmit to its members in thoroughly practical form, the results, conclusions, end-products of the work of such men as McCollum, McCann, McCarrison, Phelps, Eddy, Mercur, Mayo and many others.

The copy of Bulletin No. 1, published last month, will give you some idea of the usefulness and direct applicability in your practice of the services rendered by the League. These Bulletins are issued monthly, and each will contain vitally necessary information in such form as to be easily understood and practically useful in life and practice.

Complete instruction with regard to the selection, preparation and combination of foods in proper proportions in order to yield a balanced diet; foods in health and in sickness; special diets for special purposes; dietary prescriptions for patients in connection with local treatment for pyorrhea and other oral diseases; foods that do not agree with each other; foods to be avoided; sources of natural foods, and their supply at cost if desired; and as time goes on and membership increases in numbers and power, we shall be greatly disappointed if the League does not have a very great deal to say concerning the manufacture and sale of foods that do not feed.

Another service rendered by the League and

a very great one in the opinion of some of the acknowledged leaders in the dental profession—is the supplying to each member of a copy of Albert E. McCann's really wonderful book, "The Science of Eating," a book declared by many authorities to be the most interesting and readable as well as the most helpful ever written on the subject.

That some such service is necessary is abundantly evidenced by the fact that 95% of all diseases, oral or otherwise, have their source in constipation, a condition due entirely to improper diet, and one that no drug can "cure." Constipation is impossible when proper foods in correct combination are eaten.

The Defensive Diet League is a practical association of practical men, organized solely for practical service. Realizing the important part that such an association is sure to play in the professional life of the dentist, enabling him to render to his patients service of the very highest order, service that is impossible without a fundamental knowledge of corrective and defensive diet and of the results that inevitably follow the violation of dietary laws, membership thus far has been confined to members of the dental profession, the idea being to make of each member a genuine health-adviser to his patients.

Membership in the league offers these definite privileges and advantages:

(1)—A copy of McCann's great book, "The Science of Eating."
(2)—Copies of the Monthly Bulletin of the League.

(3)—Copies of The Dental Summary and other magazines containing special articles on dietary subjects, as issued.

(4)—Diet-lists, showing the sources of food-elements and their value in the every-day diet.

(5)—Special diet-lists for dentist and their patients.

(6)—Advice as to diet in health and disease to be supplied on request—for you, for your family from the baby to grandad, and for your patients.

(7)—Natural foods, such as unpolished rice, natural corn-meal, real whole-wheat flour, etc., supplied at cost, plus handling charges.

It seems to me that the advantages of membership in such a League must be apparent to all. To learn all that is known concerning diet as fast as it is discovered by all the able men engaged in such research, and to be able to use that information in practice, would seem to almost anybody to be most certainly well worth while. From a letter just received from Dr. Albert R. Ross, of Lafayette, Indiana, for many years identified with the Indiana State Dental Association as its secretary and president, the following is quoted:

"This is certainly the biggest proposition that the dental profession can tackle and the most fundamental. I am with you and will do all I can to help the cause."

Of course, the cost of carrying on work of this kind must be considerable. Correspondence, records, printing, mailing, all must be paid for. With facilities now available and

the help we are able to command almost without cost, we estimate the annual membership fee at \$10.00 each.—certainly a trifling matter when benefits are taken into account.

This amount is expected to cover the entire annual cost to members. We have no fads to offer, no fancy or fanciful health-foods to sell—nothing but the latest, best, most reliable information on the most important subject under the sun.

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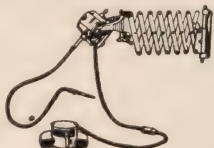
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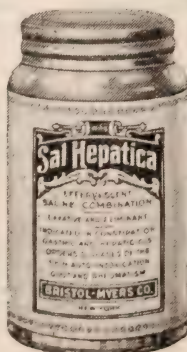
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Marquette U. Honors Dr. Midgley

Milwaukee, Wis., June 17—Marquette University bestowed the honorary degree of doctor of science upon Albert L. Midgley, D. M. D., F. A. C. D., of Providence, R. I., at the Auditorium.

Dr. Midgley is one of the leaders in the movement for the advancement of the dental profession. He is secretary of the American College of Dentistry, fellowship in which is a mark of exceptionally noteworthy achievement.

The governor and a former governor of Rhode Island, and the mayor of Providence, have written to the Rev. Herbert C. Noonan, president of Marquette University, expressing their appreciation of the honor to be conferred upon Dr. Midgley.

He was lecturer to dental hygienists in Forsyth Dental Infirmary, Boston, 1916-'18, and lecturer on the surgery of fractures in the army dentistry course at the same institution. He has also been dental lecturer in the nurses' training schools of the Butler, Rhode Island and St. Joseph hospitals, of Providence. He has read papers before every dental society of note from the Atlantic coast to the middle west and has held innumerable important clinics.

Dr. Midgley was a founder of the American College of Dentists, of which he has been secretary since 1921. He has read papers before the Rhode Island Dental Society, Guild of St. Appollonia, Phi Sigma Tau Scholastic Honor Society of the Harvard Dental School, Omicron Kappa Nu, national scholastic, at the University of Pittsburg, 1918.

He is a member of the Board of Trustees of the John W. Keefe Surgery, Providence, R. I.; president of the Dental Education Council of America from 1916 to 1921, and is now secretary. He was a member of this important dental organization since 1911. He is secretary of the committee from this council which is co-operating with the Carnegie foundation for the advancement of teaching in its study and survey of dental education.

Since 1913 he has been oral surgeon at the Keefe Surgery, Providence, and from 1914 to 1918 he was oral surgeon at the Forsyth Dental Infirmary in Boston. He was a dental surgeon in the selective service system in Rhode Island during the war. He served many years as State Dental Examiner.

Dr. Midgley was graduated from the Worcester, Mass., classical school in 1897. He attended Brown University, 1897-'98, and was graduated from the Harvard Dental School in 1901.

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

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CLINICAL AND RADIOGRAPHIC EVIDENCES OF TRAUMATIC OCCLUSION*

BY JOHN OPPIE MCCALL, D.D.S., BUFFALO, N. Y.

ABOUT TEN YEARS AGO, the condition we now designate as traumatic occlusion, began to be recognized as a definite and distinctive factor in the etiology of periodontoclasia. It was not, however, until Stillman proposed the above name in 1916 that this abnormality took its place in dental literature. Since then it has received increasing attention, although it is evident that it is far from being universally understood in the profession, or even by all who make reference to it in their writings.

Traumatic occlusion is a stress in excess of the normal, which, because it is excessive, displaces the tooth laterally or vertically in its socket beyond the normal limit of its movement. Because traumatic occlusion produces an abnormal movement of the tooth, it at once produces abnormal stimulation or irritation of the pericementum. This movement in the early stage is so slight as to be practically incapable of demonstration except by the indirect proof afforded during the course of its correction.

It is a matter of wonderment that so much tooth movement can be and is produced during occlusion while the same tooth cannot be made to move by any extrinsic force short of the forceps. That such movement takes place is evidenced by the fact that enamel amounting to a thickness of two or more sheets of writing paper may be removed from a cusp and the tooth and its antagonist will still make occlusal contact when brought together. Furthermore the relief afforded by grinding under such circumstances is so positive and so perceptible to the patient, as to leave no doubt that a perceptible and excessive intra-alveolar movement had been produced previous to that time.

There is apparently an impression in many dentists' minds that traumatic occlusion is found only in the adult mouth, and also that it is chiefly the result of drifting following extraction, or of

*Read before the Cleveland Dental Society, March 6, 1922.

improper restorations of occlusal surfaces of fillings, inlays and bridges. As a matter of fact it is quite as common in the young, and has its inception with the eruption of the teeth. It is therefore to be expected, and it is a fact that its manifestations are also common in the young, if we will but see and interpret them.

The stimulation or irritation at first produces but little demonstrable alteration in the pericementum itself, but inasmuch as the circulation of this tissue leads to the pulp and gingiva and since this pericementum is in intimate relationship with the cementum and alveolar process, the pericemental disturbance early becomes manifest in one or more of these tissues.

It is extremely difficult to describe this condition with such clarity that the dentist previously unacquainted with it, may visualize it and carry to the chair a practicable comprehension of this pathogenic agency with its many manifestations. It has been found that the most efficient method of teaching is the demonstration of this condition if present, in the dentists' own mouth, by first pointing it out and then relieving it.

No one whether layman or dentist, who has had occlusal trauma corrected in his own mouth is in doubt as to the essential nature of the condition. Yet, previous to this correction, there is usually no consciousness of strain or other indication of occlusal inharmony. It is idle therefore to attempt to locate it by asking the patient questions as to whether the occlusion feels uncomfortable, etc. Except in cases of acute or sub-acute pericementitis, the tactile symptoms are almost entirely subconscious, or reveal themselves to the patient as indications of dental or gingival disturbance rather than as a disorder of the pericementum. It must be remembered that the patient whether layman or dentist has practical acquaintance with tooth and gingiva only. Conscious disturbance around the tooth thus interprets itself to him in terms of discomfort or pain in the tooth itself or in the surrounding gingival tissue. This is an important point to bear in mind as such obscure symptoms may at times be the only definite indication pointing toward a possible traumatic occlusion.

Every dentist whether specializing in periodontia or not, who has had the nature of traumatic occlusion made clear to him, unhesitatingly affirms this condition as one of the most important actors in the production of periodontal disease. Hence it is important that all dentists should acquire a first-hand acquaintance with the subject. And it is also of the first importance that the early signs or symptoms pointing to it should be known, so that it may be corrected when present before appreciable tissue damage has occurred. Traumatic occlusion does not invariably and necessarily produce disease, but by the time the dentist is able to detect its subjective

or objective symptoms, it may safely be assumed to have become an actual pathogenic agency, and as such should be corrected.

We have said that the early evidence of traumatic occlusion is to be found in either pulp, gingiva, or bone. Cementum changes do not occur until later, but may nevertheless be an aid in making certain diagnosis of an otherwise obscure condition. The tissue to be affected will be dependent on the amount and direction of the excessive occlusal force relative to the strength of the alveolar bone, and the local resistance to infection. Given adequate alveolar support and high resistance to infection, the effect of the trauma is first to be perceived in the pulp and periapical tissue. The impact upon the teeth is felt throughout the entire pericementum. But when the alveolar walls are unyielding the circulatory disturbance becomes focused at the apex, producing a hyperemia of the pulp circulation. This is evidenced by hypersensitiveness of the tooth to cold and somewhat to heat. If recession of the marginal and cemental gingiva takes place, the exposed cementum is hypersensitive to touch and to sweets and acids. The entire tooth is hypersensitive, including the enamel, which may be quite as sensitive to the carborundum stone or disc as is the dentin.

It has long been claimed that enamel was without organic structure, and more particularly without sensory fibrils or any organic content capable of transmitting sensation to the pulp. Ample experience in grinding enamel surfaces for the relief of traumatic occlusion has demonstrated to your essayist that enamel has the power of transmitting sensation to the pulp and thence to the brain. The ability to do this is, however, only aroused to a perceptible degree when pulp excitation has occurred through the irritation produced by occlusal trauma. That there is an organic content in the enamel and that protoplasmic channels traverse its substance from the dentinal tubuli to its external surface, has been demonstrated by Chas. Bodecker. Dr. Bodecker, the son of the older well-known histologist, has devised a special method of decalcification and imbedding which permits the demonstration of the organic capsules of the enamel rods and also organic fibers passing out from the dentin to the surface of the enamel. It is undoubtedly through these channels that the peculiar sensation produced by eating acid fruits is made manifest.

The sensitiveness of the enamel is not to be looked for as a symptom of traumatic occlusion since it is usually only discovered when grinding is undertaken, subsequent to the determination of the condition. The hyperemic condition of the pulp as manifested in the hypersensitiveness at the cervix and reaction to thermal change is however to be interpreted as an indication of traumatic occlusion, if not readily accounted for by cavities or other usual excitants of this condition. This manifestation is most common in the anterior

teeth. Often the patient complains that there is a cavity in a tooth and points to an approximal surface; there may be no sensitiveness of the surface, no sign of decalcification, no reaction to thermal change. This sensation usually occurs in the bicuspid and molar region. When the sensation cannot be otherwise accounted for, it is safe to assume the presence of traumatic occlusion even in the absence of other indications of this agency.

Pulp disturbance, if not eliminated by the relief of the occlusal inharmony, may appear to subside, at least as far as symptoms are concerned. Such cases however frequently terminate in periapical abscess even in the absence of caries or deep periclasial pockets.

More common than perceptible pulp disturbances are the derangements of the gingival circulation with accompanying morphologic changes, and also alterations in the structure of the alveolar bone.

The circulation of the marginal and cemental gingiva is derived in part from the pericementum. Circulatory disturbance in the latter tissue is reflected to the gingiva, resulting in a hyperemia of this tissue. The disturbance of the circulation here seems in some cases to favor infection, since the natural immunizing forces are embarrassed by a congestion, not induced by a primary infection of this tissue. It is a fact that Nature disposes of it more readily and permanently after the relief of the occlusal trauma. In other words it is frequently possible to relieve gingivitis by prophylactic treatment alone, but this relief is seldom satisfactory or permanent unless the traumatic occlusion, if present, has also been corrected. The same cases however will almost invariably show a very perceptible improvement upon the correction of the occlusion alone, without removal of deposits. Since the visible reaction of the tissues is often our only ultimate guide in correcting the occlusal trauma, it is important that we do not by early scaling and polishing operations, bring about a superficial improvement in the gingiva and thus lose our most reliable indicator as to the state of the occlusion.

When resistance to infection is high, the most common early evidence of traumatic occlusion is to be observed in the alveolar bone, unless this tissue is very highly developed. If the stress is but little in excess of the normal, the effect is a stimulation which results in the laying down of additional bone especially in the lamina dura of the alveolus. This is a mild linear condensing osteitis shown in the radiograph as thickening and condensation of the white line which lies just beyond the dark line representing the pericementum. This may be to all intents and purpose a physiological process, and if it goes no further, the occlusal condition which calls it forth, is to be considered a potential traumatic occlusion only; but in many cases the condition progresses to a state exhibiting absorption of the inner surface of the lamina dura, thus producing a thickening of the

pericementum, or the absorption may be manifested only at the crest of the alveolar process. When either of these changes occur, and both may occur simultaneously, the condition is an actual traumatic occlusion. In other words, absorption of the alveolar crest or thickening of the pericementum when perceptible in the radiograph are to be considered as pointing to the probable existence of a deranged occlusion. If absorption of the inner wall of the lamina dura does not occur, the linear condensing osteitis may extend beyond the apex of the tooth, evidencing Nature's effort to sustain the occlusal stress. None of the radiographic conditions noted so far are to be considered as indicating a deep infection.

With absorption of the alveolar crest there is a settling of the cemental gingiva which rests on this crest. Recession of the marginal gingiva and exposure of the cervix of the tooth soon follow, often superinduced by improper methods of brushing the teeth. Recession of the gingiva then is to be looked upon as the result of alveolar crest absorption in contradistinction to the prevailing view that bone absorption is a sequel to the recession. It is a fact that infection may induce a recession of the gingival tissue in cases of congenital non-occlusion, and that absorption of the alveolar crest follows this recession and is caused by the same infection. But the condition of non-occlusion, or as it was once paradoxically termed, open-bite occlusion, is so obvious that there can be no confusion on this point at the chair. In general, then, recession of the gingival tissue should invariably arouse at least a suspicion that a traumatic occlusion is present, evidence of improper brushing to the contrary notwithstanding.

In this connection it should be noted that crown bands and rough edges of fillings usually produce hypertrophy rather than recession. The recession which takes place under such conditions is usually due to traumatic occlusion, although long continued chronic infection contiguous to a crown band will eventually cause recession and crest absorption. Such cases show no appreciable pocket formation, in contradistinction to similar cases in which occlusal trauma is present.

The circulatory disturbance of the gingiva with the accompanying infection if mild or in tissue of fairly high resistance as in the adolescent period, produces a chronic gingivitis with more or less tendency to hypertrophy. Gingivitis of any type and at any period of life is to be regarded as having its etiology possibly based upon traumatic occlusion. The suspicion is strengthened if it displays a propensity for certain teeth leaving others in the same mouth apparently immune. The suspicion is then rendered a certainty if there are no rough edges of bands or fillings to account for it, and especially if after the removal of gingival irritants, the gingivitis exhibits an early recurrence.

Hypertrophy is indicative of traumatic occlusion also when not readily accounted for by serumal deposits, crown bands, etc. It is however often due to a crowded condition of the teeth in which they have an unnaturally close approximation. The decision as to its etiology may then be uncertain.

Serumal calculus has in past writings been credited with being a primary irritant in cases of gingival disease. That is, it has been classed with salivary calculus as a deposit without any pathologic reason for existence. When discovered therefore it was simply removed without any thought being given as to why it was formed. Actually it is produced as the result of an inflammatory reaction. And when encountered, the attention should at once be directed toward the possible causes of the initial inflammation. Here occlusal trauma is to be observed as a very common primary irritating agency. Hence when serumal calculus is found, traumatic occlusion is to be suspected even if crown bands, neglected salivary deposits and other marginal irritants are present.

Another evidence of traumatic occlusion is mobility of the tooth. The tooth may or may not show recession, gingivitis, or pocket formation. It is the usual expectation that tooth mobility will only be observed in a case exhibiting well advanced pocket formation or extreme recession. But if a systematic examination is conducted it will be found that many teeth, having an apparently healthy periodontium may be moved perceptibly in their sockets by the force which can be exerted through a pair of tweezers. And many more can be seen to have a measurable bucco-lingual movement if an oscillating movement of the mandible is performed with the upper and lower teeth in occlusal contact. This movement is an evidence of absorption of the inner wall of the alveolus, a condition usually, but not invariably, perceptible in the radiograph.

Except in cases of congenital non-occlusion or of acute periapical infection, mobility is practically always an evidence of occlusal trauma, the proof being still more definite, if there is also recession, gingivitis, or pocket formation on the tooth involved.

When a pocket has been formed along one or more surfaces of the root, the indication of occlusal trauma is invariable. Food impaction while often an important complicating factor is not capable of producing the deep destruction of the pericementum often attributed to it. Pocket formation means traumatic occlusion.

If there is doubt in the mind of the operator as to whether a given case really presents a condition of traumatic occlusion, he may determine this quite definitely by watching for a recurrence of the first symptoms after treatment by scaling, polishing, and medication. It is a fact that complete scaling and frequent prophylactic treatment will bring about marked improvement in many cases, an improvement which is frequently maintained for a considerable period of

time. But if the occlusion in these cases is deranged and has not been corrected, they will sooner or later exhibit some symptoms of periodontal disease especially if neglected for even a short time. On the other hand, those cases in which the occlusion has been rendered innocuous at the outset, usually require much less after-care on the part of the dentist, to maintain in a healthy condition.

Recurrence of symptoms in mouths having traumatic occlusion is very marked in cases of phagedenic gingivitis, or so-called "Trench Mouth." This infection is thrown off at best with difficulty, and the irritation of a deranged occlusion will almost invariably bring back the inflammatory symptoms, due to the fact that the infection has never in such cases been completely eradicated from the system.

In addition to the changes observed in the radiograph which have already been noted as being due to traumatic occlusion, there are a number of other alterations of structure which are symptomatic of this injurious agency. Occasionally there is a general diffuse rarefaction of the alveolar bone, particularly noticeable in the periapical region, and involving one or several teeth.

Another condition frequently revealed, especially around the anterior teeth, is the presence of a circumscribing line encircling the apex and at a varying distance from it, similar to the condition occurring around pulpless teeth whose periapical tissues have become granulomatous. It differs from the latter condition, in that the rarefaction within this circumscribing line is very slight, and frequently the density is the same as beyond this line. It should be kept in mind that the condition here described is that of a case of high tissue resistance and one having little or no pocket formation.

Another condition is a variation of the linear condensing osteitis already mentioned. Instead of being confined to the lamina dura, it may extend from it laterally in several wavy lines toward the next tooth. This is usually seen where a tooth has been extracted and the tooth to the distal of the space has tipped somewhat as it has moved forward.

When the linear condensing osteitis begins to merge into the diffuse condensing osteitis particularly at the apex, the condition indicated is one of incipient pulp infection, whether in the presence of a deep pocket or not. In general a diffuse condensing osteitis is an indication of infection. It may occur at the apex from pulp canal infection only, or it may occur as the result of a pulp canal infection induced by traumatic occlusion. In this latter case the radiograph will also show evidence of alveolar disintegration at its crest and along the side of the root.

Pulp infection is also indicated when deep pocket formation has occurred, by a circumscribed rarefaction at the apex, the circumscribing line being located at a distance of more than two millimeters from the apex.

Pocket formation itself if occurring on a mesial or distal surface is indicated in the radiograph by a V-shaped dark wedge representing the lost alveolar bone. The border of this wedge may show a linear condensing osteitis or not. It may in cases of long standing, show a broad diffuse band of condensing osteitis. This latter condition is invariably indicative of a deep infection of the alveolar bone and connotes a negative prognosis for the tooth involved.

Hypercementosis is produced as the result of a stimulation of the pericementum. It is most commonly observed at the apices of pulpless teeth and is then one of the indications of a periapical infection. This type is bulbous and increases the diameter but not the length of the root. Hypercementosis when occurring on vital teeth with apparently healthy pulps may be bulbous, but does not usually increase the diameter of the root enough to be definitely diagnosed in the radiograph. It is more apt to assume a sharply pointed formation, causing an increase in the length of the root, and is usually readily diagnosed in the radiograph.

Reference has already been made to the fact that even when occlusal trauma is present it is often possible, without correcting the occlusion, to secure apparently satisfactory results through the medium of thorough scaling, prophylactic treatment, and the use of various stimulating agencies. Among the latter may be mentioned massage of tooth brush and otherwise, medicinal applications both antiseptic and astringent, oxygen gas and X-ray dosage. Each of these has a place of value in treatment. Each may seem to some of you to be almost indispensable. And it is a fact that thorough scaling and judicious use of antiseptic and stimulating therapy will in many cases seem to give entirely satisfactory results, at least as far as may be judged by diminution in pus flow, color of gingiva, comfort and even increased firmness of the teeth. Experience in following up such cases has almost invariably shown that a disintegration which has its foundation laid in traumatic occlusion will almost invariably progress although more slowly and with few surface symptoms.

The final result is the loss of the tooth, which in the meantime may have developed an established although painless infection with metastatic possibilities.

On the other hand, when traumatic occlusion is found to be present and is corrected during treatment, not only are the immediate results more satisfactory but the problem of after treatment is simplified and the teeth are preserved from the future gradual encroachment of periodontal disease. The earlier it can be detected the greater the benefits to be derived from its correction. So while we must ever be on the watch for signs of advanced periodontoclasia and the traumatic occlusion which may have had a part in its

development, let us be still more on the alert to detect the first faint signs which point to the presence of this arch enemy of the human dentition.

RADIOGRAPHY*

BY CLAUDE E. HINES, D.D.S., MEMPHIS, TENN.

TO-DAY we must have a different dentist from the dentist of ten years ago. His responsibilities are much greater, for he plays a much larger role in the matter of seeing to the health of his patients. He must not only be able to do a different class of dentistry than that done in former years, but he must be able to render a conscientious opinion as to whether or not his patient's mouth is harboring lesions that may be detrimental to health. He must be able not only to alleviate the sufferings of his present patients but he must be able to so teach and instruct them that those yet unborn may profit by his wisdom. The dentist of to-day must use every means to determine pathological conditions about the teeth and jaws. One of these means is the X-ray.

The use of the radiograph as a means of diagnosis has achieved a position of the utmost importance in the past few years. At the present time we are all familiar with its advantages, and the daily use of this agent has become indispensable in our work.

One of the first points that we must thoroughly understand is that the radiograph is merely an aid in arriving at a diagnosis, and therefore a proper interpretation cannot be made without taking into consideration all facts that have a bearing on each particular case.

If we are to read the radiograph intelligently, we must know the normal anatomy of the teeth and bones; we must also know the appearance that the ray imparts to plates and films after passage through such tissue; then we are able to judge when abnormalities are present.

We have often heard the radiograph spoken of as a shadow picture. It is something more than a shadow picture—it is a recorder of densities. For instance, the denser the object the lighter it appears in the negative. Crowns, fillings and most root canal fillings appear perfectly white, while enamel, dentin, cementum and bone are less dense and are slightly darker in appearance. Canals, foramina in bone and the soft tissues have no density and appear black in the negative.

When there is a pathological condition present, the normal tissue may appear changed to a lessening in density, caused by a

*Read before the Tennessee State Dental Association, Memphis, 1922.

loss of the lime salts. This is indicated by a deepening of the shadow in the negative. Then, again, we may have an increase in density, due to a deposit of lime salts. A radiograph that is so dense or badly fogged that it does not show these changes, is valueless for diagnostic purposes.

A lack of a knowledge of anatomy is frequently the cause of mistaking normal shadows for manifestations of disease. For this reason it is important that the man who would picture a part correctly should understand thoroughly the anatomy of the part he is attempting to reproduce on the negative.

There ought to be a law on our statute books prohibiting any man who is not a thoroughly competent dentist from making radiographs of the teeth; there ought to be another one sending him to prison for writing or giving a so-called diagnosis from such radiographs. What would you think of me picturing an arm, or a leg, or a hand and telling the patient he should have the limb cut off? And yet that is what is being done every day in this country with the dental radiograph, and sad to say by men who are high up in the medical profession. No wonder people are beginning to lose confidence in the theory that teeth cause disease; they have had so many good teeth extracted and so many bad ones left in, that you can't blame them for becoming X-ray shy. Physicians admit that 45% of their diagnosis is incorrect, and it is past my comprehension why they should want to increase this percentage by radiographing and diagnosing mouth conditions.

We know that the teeth are set in sockets in the alveolar process and that they are attached to this bony process by the periodontal membrane. The alveolar process is made up of spongy or cancellated bone, and this bone should appear in the radiograph as a fine interlacing network. The sockets of the teeth are lined with a thin plate of dense bone, shown in the X-ray negative as a fine white line around the tooth. This line is called *lamina dura*. Between this line and the tooth is seen a narrow dark space which represents the periodontal membrane. In the interpretations of radiographs the absence or change in the form of these lines may mean a diseased condition. Above the apices of the upper central and lateral incisor teeth may be seen the floor of the nose. This appears in the radiograph as a large, dark, irregular shadow, which can easily be mistaken for a cyst or abscess cavity in the bone.

Over the upper bicuspids and molar region is found the maxillary sinus. This sinus varies in shape and size in different persons. Sometimes there is considerable bone between the ends of the roots and the floor of this sinus; at other times the roots of the teeth appear to enter the sinus, but under normal conditions they are always separated from it by a thin layer of bone. It is impossible to tell from a radiograph whether or not the roots of the teeth enter

the sinus. The sinus appears in the radiograph as a large dark irregular area, and must not be mistaken for a diseased condition.

Just behind and between the upper central incisors is found the anterior palatine fossa. This is frequently seen in the radiograph as a dark shadow a little above and between the apices of the central incisors and is easily mistaken for a diseased area. Occasionally we can see the posterior palatine canal as a dark shadow in the wall of the antrum in close relation to the palatal roots of the molar teeth.

The malar bone's chief function, so far as the radiographer is concerned, is to prevent him from getting perfect pictures of the upper molars. Many devices have been suggested to help the radiographer to avoid the malar bone—sometimes they work, sometimes they do not.

In the lower jaw the mandibular canal runs below the apices of the teeth as far forward as the first bicuspid. In the radiograph the roots of the teeth may appear to project into the dark space representing the canal. In reality they may be situated to one side or the other.

The mental foramen is situated below and between the roots of the lower bicuspid. Frequently the connection of the mental foramen with the inferior dental canal may be seen in the radiograph. The mental foramen may be easily mistaken for a rarefied area. In fact, I believe this mistake has been made a greater number of times than any other, and many good lower bicuspid. have been sacrificed on account of this error.

Again I repeat, that no man is capable of making a radiograph of the teeth unless he thoroughly understands the normal appearance of the part he is raying, and can visualize in his mind's eye how the tissues appear in health.

A diagnosis should never be made from a plate or film unless we are satisfied that it is a perfect replica of the parts rayed. It is sometimes necessary to take a picture two or three times before this has been accomplished. The old saying that "what is worth doing, is worth doing well" applies to the utmost both in making and reading dental radiographs. The longer one is engaged in doing this work the more conservative he becomes.

We frequently hear people say, "Dr. So-and-so says my pictures show pus at the ends of the roots of the teeth." No man ever saw pus in a radiograph any more than he could see a drop of water. Again we hear, "My dentist examined the tooth carefully after it was extracted, and there was nothing wrong with it." In other words an attempt had been made to convey the impression that a mistake had been made in the radiograph, and that the tooth was unnecessarily sacrificed. The fact is, the real

seat of the disease was not in the tooth itself but in the surrounding alveolar process.

From a study of the radiograph we can say only whether or not there is a departure from normal; yet our knowledge of clinical conditions often reveals points that help us to render a correct diagnosis. Thus, a large round or oval area of bone rarefaction with very sharply defined edges, is good evidence that a cyst is present. A small area with ill-defined edges merging into the surrounding healthy tissue would indicate an infective process. A slightly larger area with well defined edges would indicate a granuloma. The size of an area has no relation to its pathogenicity. Disease may be present without pus. A tooth may contain an infected, necrotic pulp, giving rise to systemic disease, yet show no evidence of it in the radiograph. A sinus discharging pus may be present without bone destruction. Thus we see that the radiograph has its limitations in diagnosis and should only be used by men who have a practical knowledge gained by the everyday practice of dentistry.

The technic of making a dental radiograph is an exacting one. From the seating of the patient in the chair to the final examination of the film, every step must be done in a definite way. Failure to recognize this fact is responsible for so much of the bad work the other fellow does, to say nothing of our own efforts. The patient should be seated in an upright position. When radiographing the upper molars, upper bicuspid, lower molars and sometimes lower bicuspid, this position should be maintained. For radiographing the upper incisors the chair should be tilted to an angle of 40 or 45 degrees. For radiographing the lower bicuspid, lower cuspid and lower incisors, the back of the chair should be tilted to an angle of 15 to 20 degrees. The object of this is to have the roots of the teeth, with the exception of the upper incisors, in just as near a vertical position as possible. It is impossible to make a perfect radiograph of the teeth with the patient lying down, except by chance. The patient's mouth should be examined, the angle of the tube, the distance of the tube target and the penetration of the central ray should be determined and the machine set for the exposure. There should be no occasion to hurt the patient in placing the film in the desired position. Films should never be bent when placed in the mouth, because that will produce a distortion of the image. The only exception to this rule is in the case of lower bicuspid where sometimes it is permissible to slightly bend the film to conform to the curve of the cuspid region. The patient should be instructed how to hold the film in the mouth while the exposure is being made. The time of exposure varies with different machines and with the distance from the tube target to the film.

I use a 30M Coolidge tube, 4-in. gap, 15M, and my target distance is from 25 to 30 inches. My exposure time is from $2\frac{1}{2}$ to

4 seconds always using fast films. It has been my experience that the greater the target distance, up to a certain point, the more perfect the picture, and especially is this true of upper molars. I am not sure but I believe this is due to the elimination of the short rays. But one thing I am sure of, and that is that the patient is in no danger of shock of any character. I have had the misfortune of seeing one patient shocked with the Coolidge tube. I don't want to see it again, and for that reason, and because of the fact that I believe I get better pictures, I have adopted this long-distance technic. I don't care what the representative of any X-ray concern may tell you, all X-ray machines *are dangerous*, and the wonder is that more people have not been killed than have been. For this reason I am unalterably opposed to the small dental units carrying the 10 mil. tubes. They have to be placed very close or right against the patient to get a picture, and there is no telling what might happen if the machine should become grounded. It is always the unexpected that happens, and for that reason too much care cannot be exercised in the handling of machines.

When the film is exposed it should be taken from the mouth and wiped dry, because if the saliva seeps into the package the film will be marred in some way.

When we consider the wide-spread use of the radiograph it is surprising how few of the countless numbers made are completely satisfactory. Many of them seem to have been taken with an inferior machine, others have been taken at a wrong angle and are so badly distorted that they are of no value for diagnostic purposes, but the vast majority are bad from a photographic point of view. Many radiographers seem to think that proficiency in handling the X-ray machine is all that is necessary and do not give any consideration to the development of the exposed film.

The practice of developing films in small tumblers or trays, I believe is responsible for more poor work than any one thing that I know of. It is impossible to have the temperature right and keep it right by using such a method. Most radiographers who employ the tray or tumbler method pay not the slightest attention to the temperature of the solutions. They fill the tumblers from a bottle of stock solution, and for all they know the temperature may be from 60 to 90. With too cold or too warm a developer he may produce a negative which will appear correct when viewed before the red light, but the finished product will not be correct.

The tank method is the ideal method of developing. No radiographer who has given it a thorough trial would be satisfied to develop his films by any other method. Tank development is based on the action of a developer of a given strength, for a given length of time at a given temperature, and the chief reason that it gives such splendid results is that the radiographer is compelled to know

the temperature of his developer in order that he may know when development should be stopped. When the tank method is used there is no risk of incorrectly judging the density of the negative for they are never examined during development. Density is determined by the length of time of development, and the correct development is determined solely by the temperature and strength of the developer. The temperature of the developer should be as near 65 as possible and never over 68. The films should stay in the developer for five minutes, then rinsed, and placed in the fixing bath for at least ten minutes. They should then be washed in running water for ten or fifteen minutes and dried under an electric fan. A method that has been of great value to me is the reduction method. Negatives which are too dense, due to over exposure or over development can easily be reduced to normal by transferring them from the fixing solution to a weak solution of red prussiate of potassium. The action of this solution is very rapid and must be watched closely. To avoid streaks the negative should be rinsed thoroughly before holding it up for examination. As most negatives are too dense, I consider a knowledge of the reduction method very important, and endeavor to explain it thoroughly in my clinics.

It is very essential that the man who would make good radiographs have a well fitted-up dark room in which to do his developing. A dark room is simply what the name implies—a room from which all light has been excluded. It is very convenient to have running water in the dark room but it is not absolutely necessary. Aside from the developing tanks it is important that we have sufficient light to enable us to handle the films; hence it is necessary to have a dark room lantern. A green light is better than a ruby light, because it gives us more light to work by without any more danger of fogging the films. In the summer an electric fan is necessary to keep the room from becoming too warm. And last but not least a thermometer should at all times be at hand for testing the solutions. In handling films in the dark room they should be handled by the edges, for if the fingers touch the sensitive side it is likely to result in spotting the picture. After placing the films on the clips, one should be very careful never to allow the fingers to come in contact with the developing solutions. Serious skin troubles have been known to result from constantly^e emerging the fingers in the developing solutions.

This is an opinion of mine and can be taken for what it is worth,—I do not believe that any man will ever get as consistent results with the developing boxes as he will by using a well fitted-up dark room. Successful radiography is not a mere matter of pressing the button of an X-ray machine, but consists of consistently carrying out every step of a well defined technic, and he who would

succeed must be willing to meet his failures with a smile and try, try again.

Authorities consulted: Raper, McCoy, Duke, Ivy, Wendell.
Central Bank Building

INTRODUCING THE "T" GRIP FORCEPS

BY W. A. LURIE, M. D., NEW ORLEANS, LA.

THE OPERATION HERE PICTURED, that of tooth extraction, is among the oldest operations performed upon the human body. Antedating the time of the oldest recorded operation, tooth extractions were performed by the deftness of the fingers of the operator. The mechanical means for the extraction of teeth came later, and since then has made little or no progress.



The forceps in use have been but a duplication of the force such as might be utilized by the application of two fingers in an attempt to grasp or hold the tooth. The idea of continuing or better effecting the application and the increase of force was the paramount idea in the making of forceps. It was thought that with forceps which could duplicate the grip of the fingers that the operation of tooth extraction would be simplified and made easier.

As dentistry developed, and particularly in the last decade, it has been proved that the removal of teeth may be better effected by their rotation (with the exception of the posteriors) before elevation or extraction. In keeping with this advance, the extraction of teeth has passed from the fundamental stages as performed by barbers and blacksmiths or the traveling operator, to the legitimate dentist, and then on to the present-day exodontist and oral surgeon.

In this later step of progress the exodontist and the oral surgeon have developed a newer and more effective method of operation, because they have learned to do this work from the front of the patient, where an accurate and true view of the field of operation can be had.

In the teachings in dentistry up to the present time, the forceps in use for tooth extraction, being capable of transmitting a force similar to that of two fingers only, to effect extraction, had to be applied, as the two fingers of old, over the patient's head. This again is a relic of pre-anesthetic days when the forceps were applied from behind and out of range of the patient's vision, out of regard for his nervous sensibilities. After the advent of simple anesthesia the teaching of the overhead-method of tooth extraction has been continued. Since the time of the introduction of the two-beak forceps there has been no improvement except in the shape of the beaks. These improvements permitted only their better application to the various teeth. To perform extraction from in front of the patient has not been contemplated nor attempted. Except as oral surgery it is not being taught. This condition exists, no doubt, because of the lack of the proper instruments with which to perform the operation in such a manner.

There are both advantages and disadvantages to the removal of teeth over the head of a patient. However, with the continued practice of tooth extraction as the surgical operation it truly is, the operation performed from in front of the patient will no doubt be found to have the greater advantage and lesser disadvantage.

The most menacing disadvantage of the present-day forceps arises in the application of force for the lateral movement of teeth before extracting. The resistance of a tooth is sometimes very great, and when the lateral force is applied the firmness of the tooth causes the forceps to spread in the grip. The beaks then come in contact with the teeth at points instead of planes. It is a known fact that if force is not equally distributed to an object, that object may break. The force from the beak of a forceps, delivered at a point, may cause a tooth to break.

The best application of force is in a straight line. Direct force cannot be had in the present-day forceps because both beaks are movable; and when application is made both beaks move away from the center of the forceps. The tendency is to spread the grip.

To direct the forceps for their proper application it is necessary to exert a given amount of pressure. The only means to prevent the slipping of the forceps while their application is being made is the corrugation on the handles in the grip. In a difficult application over a large tooth there is a tendency of the handles of the forceps to spread. The span of the forceps is then so great that it is im-

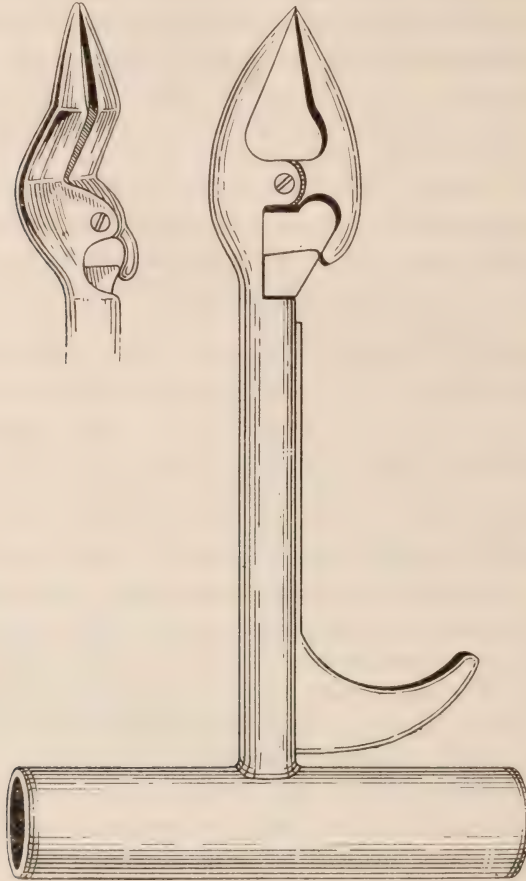
possible to get the proper amount of muscular pressure to hold the beaks in position. The forceps are then held in a hand made tense by the attempt to span the open handles. This is a difficult application to a tooth. The power of the fingers of a spread-hand cannot work in two ways; that is, in force of application and force to maintain it.

That is to say that the hand attempting a tight clench to make a proper application cannot utilize enough energy in another direction to make the application deep enough to be a proper one. Therefore, in attempting elevation or rotation, the operating hand exerts a force to keep the beaks in application and at the same time a second force exerted through the same muscles to perform the balance of the operation. The muscular force is exerted by the same set of muscles. These muscles therefore must play a double role and do two distinct operations at the same time. To make and maintain a proper application, one minimizes the energy possible of application to rotation, etc. and *vice versa*.

The slipping of forceps, after a good application is made is most often the result of a relaxation of the muscles of the hand. Then, too, the force necessary to maintain the application during manipulation is greater than at any other time. Here again another danger is met. If there is greater force expressed to maintain the application than there is used in the manipulation, the breaking or crushing of a tooth root is liable to take place.

All the muscular force and modes and reasons for application of the forceps have been carefully studied. To make their application easy and more certain a new forceps and handle has been constructed and is here presented. Experience with this instrument has proven that many of the faults and difficulties of the older-type forceps have been overcome. The various types of jaws adaptable to the different teeth can be used with this type of handle. In this forceps one of the jaws or beaks is stationary and permanently attached to the handle in its long axis, so that when force is applied it is applied along that line and in the long axis of the tooth. The movable beak is pivoted and operates about a fixed point in the straight shaft. The operating beak is on one side of the fulcrum, and a free end on the other. It is through the free end that the force of closing the beaks or jaws of the forceps is effected, and when once the beak is set in position, no force or energy is required to maintain it there. Any stress at the beak is transmitted to the triangle block at the end of a movable bar. The movement of the block is controlled by an easy finger movement near the grip of the forceps. As this motion and force is indirect, it requires no effort to maintain it. This leaves all muscles free to perform an individual purpose.

Referring to the illustration of this forceps and particularly the movable beak, it will be seen that a wedge prevents the opening of the beaks after they are closed and that member drawn into position. Very little force is required to close the beaks. The force in closing the beaks is supplied by one finger of the hand. No force is required to maintain it there after such closure. After the



forceps are in position about a tooth, the operator is able to apply whatever character of force he chooses to use, in a direct line, through the center of the tooth and in line with the long axis of the tooth. This force he is able to apply with free muscular effort; that is without having his muscles cramped by endeavoring to perform two functions; or more properly, not trying to do two things with the same set of muscles at the same time. With this forceps, crushing of a tooth or its breaking because of the too severe application of force in closing the beaks is avoided because the force of application stops on the closing of the beaks.

A surer and deeper application can be made with this type of forceps because of the T-shaped handle. The force of application is a direct push from the wrist, the T-handle making slipping impossible. Because of the T-shaped handle a perfect rotary movement may be had without any muscular strain or slipping because of loosening of the grasp of the tooth. This type of handle also assures equal force on the breaking or buccal movement. Movement through the fixed beak being in the long axis of the forceps, it acts as an elevator. Even in particular cases where a variety of sizes of jaws or beaks may be required, their use may be possible with the same handle or fixed beak.

This forceps is well made, so that breaking is minimized. It is so constructed that it can be easily taken apart and sterilized.

To recapitulate and summarize the advantage of the new forceps over the old reference is directed to the following table:—

TWO-BLADE FORCEPS

1. Force indirect in application
2. Operating force indirect or out of line of muscular action and joint movement.
3. Force out of axis of tooth.
4. Gripping or clenching of hand necessary to maintain application.
5. Application difficult because of possible slipping of forceps in grasp.
6. Good application often prevented because of closing of beaks to grasp forceps.
7. Muscular force to close beaks and to keep them closed.
8. Hand must be tightly clenched to perform rotation or elevation.
9. Non-separable for sterilization.

Maison Blanche Bld'g.

T-GRIP FORCEPS

1. Force direct.
2. Operating force direct and in line with normal joint force and movement.
3. Force applicable in long axis of tooth.
4. No force necessary.
5. Slipping of forceps during application impossible.
6. Straight application without grasping force possible and in a fixed line.
7. No force to close beaks: muscles free to perform balance of operation.
8. No muscle action necessary except on handle. Muscles free to produce rotation or any other form of movement.
9. Separable for sterilization.

THE SURGICAL MANAGEMENT OF SERIOUS FOCAL INFECTION CASES. WHEN CAUTION IS TO BE EXERCISED AND WHEN SURGICAL PROCEDURE IS INDICATED*

T. A. HARDGROVE, D.D.S., FOND DU LAC, WISCONSIN

THERE ARE SO MANY diseases that can be traced to oral focal infection, that this paper will aim to deal only with patients sufficiently ill so as to make dental and oral surgical operations a serious procedure. The heart being the organ most concerned in that class of cases, we will confine our remarks largely to that field, and will discuss them only as they concern the oral surgeon.

The object of this paper is to present for discussion one feature of the practice of dentistry and oral surgery that is not receiving the consideration it deserves. There is a splendid paper written by H. E. Friesell telling us in substance that the foundation branches taught in the dental school will eventually be equal to, and the same as, those taught by medical educators. Then it will be easier to exercise proper judgment under joint treatment of cases. But until that time we must endeavor to so prepare ourselves that our judgment will not only be equal to, but surpass that of the general surgeon in this field, because he cannot know his patient from the dental point of view with the slight training he has in dental subjects.

CARDIAC RISKS

The classes of patients requiring surgical judgment are mostly those suffering from some form of heart disease. While the different gross symptoms detected in the examination of the heart are just now causing a great deal of difference of opinion when it comes to the interpretation of them, there are, however, things that are important for the surgeon to know. Both high and low blood pressure are of importance, and we should know, if we can, what it is caused by or at least with what pathology it is associated.

Quoting from a recent article written by Arthur R. Elliot, of Chicago, he says:

"The net result of persistent arterial high blood pressure, after due allowance is made for physiologic factors of adjustment, is overwork to the dynamic side of the circulation—the heart and the arteries.

"For a variable period compensatory adjustment proves adequate to maintain circulatory equilibrium, but in course of time demands on

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the heart resulting from stress and strain and continued high blood pressure outrun cardiac adaptability, and exhaustion of heart muscle takes place and circulation ceases. As observed clinically, this type of failure may manifest itself in several ways. The heart perhaps, without previous display of serious indications of exhaustion, may suddenly collapse under the strain and death takes place with the phenomena of acute dilatation. This is, comparatively speaking, an unusual form of circulatory failure in a high pressure stasis, and is most often induced by severe, sudden physical or emotional overstrain."

Taking those conclusions into consideration at this point, I would like to call your attention to a certain type of case which we are called upon to deal with. A patient, for instance, was brought into the hospital complaining of pain and stiffness in the back; pyorrhea; tonsils infected; knee-jerk exaggerated; varicose veins in both legs; murmur in aortic area undefined; urine examination, specific gravity 120; reaction, acid; albumin hyaline casts, bacteria, a few. The family history showed father, mother and three sisters living and well. One sister died of pulmonary tuberculosis at the age of sixteen; wife and two children living and well. Previous diseases: Grip, tonsillitis and rheumatism, and an operation for appendicitis in 1903.

The chief complaint at this time was pain in the back and the lower lumbar region. The patient was a tall, bony, thin man. His clinical history is as follows: Began complaining of pain in right leg, due to varicose veins; pain radiating to right pelvis. An acute phlebitis supervened. Several weeks later he developed phlebitis in left leg. Pain and cramping in lower lumbar region were present at this time also. For three weeks the patient complained mostly of severe pain in back, which was aggravated upon receiving a jolt of any kind. He was weak in the lower limbs. In turning in bed he received severe catching pains in back, lasting but a moment and returning with the least movement. He gave a history of renal colic recently and thirteen years previously. He had frequency of urination and pain resembling renal colic or bladder tenesmus.

The writer was asked to see this patient and was advised by the physician to remove all of the infected teeth, which meant all of the teeth in the mouth. At that time his pulse was not particularly rapid, and while it was not very strong, it seemed to be of fair quality. There was, however, something alarming in his general appearance; he appeared to be apprehensive and easily shocked. It was thought best to see him two or three times before doing any extracting in order to allay his alarm, and detect if possible any changes that might occur from day to day. But upon finding him in the same condition each time, and upon the physician's advice,

two teeth were extracted with no bad result except a pulse of 80, if that could be considered an exaggeration. Three days elapsed, during which time he was kept under observation each day and as he appeared to be as well or a little better than when the last teeth were extracted, six more teeth were removed. His condition remained about the same on the ninth day, when five more teeth were extracted. At this time he appeared to be feeling much better, and on the tenth day the patient's condition was very good. On the eleventh day, four additional teeth were extracted. These teeth were all loose. The patient was feeling particularly well and slept soundly until 3:30, when he complained of shortness of breath and died at 4:45 of acute dilatation of the heart or muscle exhaustion and collapse.

The post-mortem findings showed adhesions from the left lung to the pleura above the diaphragm; adhesion of large blood vessels to the sternum, left lung adherent to lower pole; lower left lung congested and hard, showing a mottled and consolidated area; right lung dark red, but soft, a postmortem change; no nodules or scars, heart large, pericardial fluid normal in color and amount; whitish spots present on posterior surface of heart near the large vessel; slight dilatation of the right auricle, with a thin wall, which may indicate previous dilatations. It may be that the auricle failed with a sustained pressure. All of the valves and coronary vessels were normal except in the right auricle. Liver about one and one half normal size, dark red in color, with sharp edges; gall bladder normal; stomach showed an old healed ulcer near the pylorus; many adhesions about the appendicial scar in right abdominal region; enlarged glands near the tail of pancreas. It would seem that in the beginning it was a focal-infection patient that passed through all of the changes suggested by Rosenow. Spleen and left kidney slightly enlarged; otherwise normal in appearance; right kidney normal in appearance; prostate fairly large and adherent to pelvis; intestines normal. Laboratory findings showed a mild condition of brown atrophy. Cultures were made from mottled area at once, but they were negative after three days' incubation. Liver showed central passive congestion. Cause of death—acute dilatation of heart. Coronary vessels appeared to have been obliterated in the walls of the auricle to some extent.

My object in introducing this record at this time is first, that we may take into consideration the question of shock. We, as dentists, are liable to deal with shock as it is associated with people who are not particularly sick. The fact is that there are many patients with dangerous pathology, and when we add to that the shock associated with anything in the nature of an operation, we are jeopardizing the patient's chances. The temperature in this

case was normal except for a short period when it went to 99.8° , and it would probably have made but very little difference with the patient except as far as time was concerned. Undoubtedly this patient had lived very close to the length of time his pathology would permit him to live. However, we must not assume that in cases of this type the operation has not contributed to an earlier termination of life. The patient had a history of circulatory degeneration. He undoubtedly had, due to focal infection, a gastric ulcer that healed, and suffered from phlebitis which never seemed entirely to cure itself. Taking the whole history into consideration he could not be considered a good risk for even extraction of teeth, and while we can, as a rule, rely on the judgment of the physician in charge, yet many times it is impossible for him to advise as to the safety of a slight operation; and it will be necessary for us to prepare ourselves in such a manner as to assist in detecting the dangers that are liable to follow in the wake of minor operations upon the jaws when the pathology of the heart and circulation apparatus is seriously impaired.

Let me present a different but dangerous type of patient, suffering from sore jaw, roughly speaking, due to an infected impacted third molar, abscess and pyorrhea, and following in this case the extraction of one or two teeth. Within a few hours the pulse and temperature rose abnormally high, remaining though in regular physiopathological proportion, but did not yield to medical treatment, until the sockets from which the teeth were extracted were reopened and drained. A few days intervened before another extraction of pyorrhea-infected teeth, which was followed again by the same sequence of a rapid pulse and temperature, and relieved again by the reopening and draining of the socket from which the teeth were extracted. And in that particular case, following the extraction of each infected tooth, it was necessary to maintain free drainage in order to prevent an exaggeration or racing pulse. That is one type of case that demands attention following the removal of teeth and points out the value of watching every infected case and providing proper drainage for it. The object in removing a focal-infected tooth is to establish drainage and the same principal applies here as in the drainage of an abscess in any part of the body. It is that kind of a case, if neglected following the operation for removal of teeth, that is liable to prove fatal, but if attention is given a fatality can be avoided, because the patient's pathology is not of the type that was beyond repair. However in the first case cited, the damage had gone beyond correction.

Here are two types of cases, both dangerous. The one dangerous immediately because of injury done to the different organs by the original infection and overstrain on weak heart muscles; the

other, very likely a case that would continue for eight or ten days or longer, and if attention had not relieved the patient, he would have died of a general infection.

There is a type of case that you can always consider dangerous. It has been our experience in St. Agnes Hospital at Fond du Lac, Wisconsin, in serious focal infection work, that whenever it became apparent that the patient was or had been one of high pressure and that had produced high-pressure stasis changes in the kidneys, the symptoms of which are failing functions of the kidneys, these cases are usually travelling in the direction of a fatal termination.

Let me at this time discuss a case that originally was one of high blood pressure with cardiorenal complex. It is not the case of high blood pressure at the time we operate that is always dangerous. It is more apt to be the case that has once had high blood pressure and is now losing that feature, indicating that the heart is yielding to a gradual exhaustion of myocardial tonus, with the characteristic syndrome of progressive asystole and falling blood pressure with kidneys failing in function. It is that type of patient to which our attention is called, especially where the pulse remains fast and feeble and that at the least disturbance in the nature of an operation, there is an increased number of beats of the heart continuing over quite a long period of time after the extraction of one or two teeth. We are then dealing with a heart whose muscular structure is weakened to a point where it is dangerous to the life of the patient to do anything in the nature of an oral operation.

Just let me give you a short record of this case. At the time this patient, a man of forty-eight years of age, who had been an electrician in the active part of his life, was brought into the hospital, the diagnosis showed cardiorenal complex, nephritis primarily. He was married, wife and two children living; previous diseases and injuries, none; addicted to coffee, tea and tobacco. His chief complaints were shortness of breath, dizziness, loss of strength and weight. Dental history showed that he had a severe pyorrhea, which resulted in the loss of five or six teeth in a few years; at this time he had eight or ten loose and infected. Urine was examined, which showed indication of an advanced nephritis present. He had a severe sense of pressure in mid-abdomen, was pale and anemic, and had lost thirty-five pounds during the year. No teeth were extracted at this time because it was considered unsafe. The patient was discharged, but returned in six weeks for treatment, very weak and restless, suffering from dyspnea. Six teeth and roots, all of which were very loose, were removed to get rid of infection, according to the physician's instructions to the oral surgeon. Oral surgery notations indicated that the patient was a poor risk. On March 7 two more teeth extracted; on March 9 he was discharged,

apparently improved. I might say, however, that following each operation this patient showed a tendency to run a fast feeble pulse, which did not improve as time went on. Having decided, therefore, to do no more extracting at this time, the patient was instructed to return again, which he did, and appeared to be much improved. An effort was then made to remove a few teeth, with a more disastrous demonstration than previously. It was thought best again to discontinue any further extractions at this time. Later, following the removal of the last teeth, the patient became hysterical and was hysterical all night. In forty-eight hours, without consulting a physician, he left the hospital and went home, a distance of forty miles. For a time he appeared to make considerable improvement, and he was anxious to have the necessary teeth removed. After taking the history of this case into consideration and knowing the patient had associated with his circulatory disturbance a nephritis with a failing function of the kidneys, it was not thought advisable to do so. In two weeks he died of cardiac failure. It seems to be a coincidence that just previous to collapse, many times patients with failing circulation seem to be feeling very much better. We should not be deceived by that symptom. This case very nicely illustrates the point stated before, that high blood pressure stasis and failing renal function point toward a fatal termination.

The suggestion then, in dealing with this class of cases is, that in most instances the therapeutic measure of greatest benefit in these cases of weakened heart muscle, is rest, and that as a rule, that rest period is not long enough. If the patients are doing pretty well we should wait until rest has strengthened the heart to the point where the tax upon it as a result of extraction operations is not so great, as not only are the patients in danger from the reaction of their infection, but in danger of more serious trouble from the shock and the depressing effect of the anesthetic.

IMPORTANCE OF PULSE PRESSURE

One of the most important things to guide us in the advisability of operations for people whose hearts may not prove equal to the strain, is the pulse pressure. It is not so important to be sure of the amount of blood pressure a patient may have, but it is important to know what the pulse pressure is. Whenever the pulse goes below one-third of the systolic pressure, it is a condition for apprehension. If it goes below fifteen or twenty we must consider him a patient upon whom it is dangerous to operate, and one upon whom it is dangerous also to use any form of anesthetic, local or otherwise. In other words, when the systolic and diastolic approach each other it is a sign of danger. It may be that we think we can rely on the adrenalin contained in the novocain or apothessin used as an anesthetic. While it is true that the adrenal raises the pulse pressure, it

is only temporary and the reaction is liable to carry the patient to a lower level of pulse pressure and increase the danger associated with the case. We must never forget not only that the patient is in danger from overstrain and shock, but back of all are the bacteria which was the original cause of the disease, probably lying dormant, but capable still of a tremendous demonstration following the disturbance of the point of location. We must never fail to take into consideration, in forming judgment upon these cases, the amount of resistance to disease, or, in other words, the immunity, which can be arrived at by an examination of the patient's previous history and record, and by a comparison with the symptoms manifested at the time of disturbance. If, following the removal of the teeth or an operation on a focal infection area, the patient's pulse rate is increased rapidly and the temperature correspondingly for a short period of time, followed by a relapse of temperature so that the patient appears to have returned to normal, we have a patient who has the ability to develop a resistance or immunity to his disease. In other words, he has the ability to call out antibodies to the point where he is able to combat his disease. We will be guided then, only as to the extent of work we had best undertake, whether it should be less or more than we have just done. But on the other hand, if our patient develops a rapid pulse and a temperature which does not subside, then we know that we have a patient whose immunity is not dealing effectively with the elements that make for disease. And there is still another type clinically observed which has probably escaped observation more than any other because he develops a rapid heart action with only a slight temperature, and in some cases no temperature at all, but the pulse rate remains materially fast and feeble. This is a very dangerous type of case, and without the most careful watching is liable to slip away from both the physician and the dentist.

We occasionally find ourselves confronted with the proposition of the extraction of teeth for a patient who has a very much enlarged or hypertrophied heart. In some respects the hypertrophy is a compensatory measure, and while this patient is to be treated with the greatest caution, yet he cannot be considered as dangerous as some other types. He usually will endure things that patients with cardiorenal pathology will not.

Both dentists and physicians are being very much criticised and probably justly so, for unscientific and uncertain use of the word "Myocarditis". W. D. Ross in his textbook says in substance: "Chronic myocarditis is a slow sclerosis of myocardia, developing secondary changes in the coronary arteries. The essential lesion of the coronary circulation productive of myocarditis is a narrowing or obliteration of the lumen. The result of destruction of the

embolic occlusion, endarteritis, or the coronary circulation, is merely part and parcel of general arterial sclerosis." If we are therefore confronted with the proposition of determining just what a chronic myocarditis is, we should think first of the condition as an arterial sclerosis of the myocardia, and that its result is not liable to be confined entirely to the heart itself, but symptoms of sclerosis are apt to be found in that type of patient in other parts of the body. Physical signs of chronic myocarditis are not characteristic and distinct. They vary as the disease progresses, as in the acute form of diseases the heart sounds are usually less muscular and more valvular in quality. They are accentuated in the presence of compensatory hypertrophy, and they are enfeebled after dilatation has taken place. The aortic second sounds are frequently accentuated due to arterial sclerosis. The pulse is hard and tense with stiff arterial walls and is often disordered in rhythm. The area of cardiac dullness is often found extended from cardiac hypertrophy or dilatation. Murmurs are encountered in the purely valvular cases and in cases associated with cardiac dilatation. Diagnosis of chronic myocarditis is based partially upon physical signs, but mainly upon the finding of arterial sclerosis in a subject past middle life, who presents such signs as chronic dyspnea and pulmonary congestion which aid in suggesting the disease. So that while it may be true that the term is being rather loosely used, yet those who are ridiculing its careless use are not able themselves to lay down in absolute terms the diagnostic signs of myocarditis.

LOCAL CONDITION, IF TREATED WITHOUT PROPER CARE, BECOMES SERIOUS

There are several local conditions that, while not dangerous to the patient's life are yet serious enough to people's health to deserve mention at this time. One of these is the statement so often made by exodontists that in the removal of teeth if the antrum floor is open no great harm comes of it. In this day of preventive medicine that statement cannot go unchallenged, for the man who makes it does so without taking into consideration the nature of the bacteria liable to enter and cause disease of the maxillary sinus. I do not believe it is a wise procedure to allow Pfeiffer's or Friedlaender's bacilli or the streptococcus hemolytica to enter an innocent and uninfected antrum for the reason that the antrum mucous membrane lining is continuous with all of the accessory sinuses. The activity of those organisms is of such a character that once they gain access to the sinuses it is a very difficult matter to eradicate them and prevent their deleterious effects. As it is impossible for anybody who opens the antrum in an operation for the removal of teeth to know what type of infection is liable to enter it from the mouth, it becomes not only serious but a dangerous accident.

The next type of local work that comes within the border of serious operations is an heroic effort for the removal of the cyst mandible that in their removal the slightest pressure exerted is liable to result in a fracture of it. It is saner practice in those cases past fifty-five years of age to remove the obstruction in front of it, facilitating its removal and providing drainage, than to make the patient take the risk of a fracture under those conditions. It is not often that we come in contact with these cases, but I am speaking only of the occasional case which presents itself for treatment.

While in conversation with your Secretary, Dr. McMeechan, he called my attention to the danger of dealing with patients that are hemophiliacs, but don't know it. This brought freshly to my mind a case in practice while in the removal of a small cyst a cavity was opened where a hemotoma had formed, due to an extraction that had been made a week previous, the patient being a hemophiliac. A good deal of trouble was experienced in controlling the hemorrhage, pointing out not only the danger of a patient being a hemophiliac, but the danger also of coming in contact with a hemotoma and this emphasizes the importance of making a blood clotting test. I am indebted to him for calling my attention to it, and mention it now so that it may be taken into consideration.

Since the anesthetic used in this class of work is of importance I will present the following experiments directed by myself upon young guinea-pigs, ranging in weight from 250 to 300 grams, to determine the comparative toxicity of apothesine and novocain so commonly used.

Before reading the following experiments I want to give full credit to Sister M. Jeannette, the pathologist and bacteriologist at St. Agnes Hospital, Fond du Lac, Wisconsin, for carrying out the technic and tabulating so correctly, and to the Hospital itself for its co-operation and assistance. Sister M. Jeannette is a most earnest and masterly pathologist. She received her training in this work at the Wisconsin University, which qualifies her beyond any question, and I was fortunate in having her assistance. The co-operative work done in these cases was done in association with Drs. Wiley and Smith and Drs. Twolings and Calvey.

AUGUST 6, 1921

1. Injected pig in heart chamber with 1 cc. sterile water. Pig lived, showing no deleterious symptoms.
2. Injected pig in heart with 0.08 grains of novocain. Pig lived showing no symptoms.
3. Injected pig with 0.32 grains novocain in heart. Pig died within ten minutes following spasm.
4. Injected pig intraperitoneally with 1.6 grains novocain. Pig lived showing no symptoms of ill effect from the drug.

5. Injected pig intraperitoneally with 6.4 grams novocain.

Pig showed marked tetanic spasms and died within four minutes.

6. Injected pig with 3/16 grains apothesine in heart. Pig died within five minutes, showing general weakness but no tetanic spasm.

7. Injected pig with 3 3/4 grains apothesine intraperitoneally. Pig died after ten minutes showing general weakness.

8. Injected pig with 7 1/2 grains apothesine intraperitoneally. Pig died within five minutes, showing increasing general weakness.

AUGUST 12, 1921

NOVOCAIN USED

1. Injected pig with 0.08 grains in heart. Tetanic spasms started immediately after injection. Spasms ceased after a time. Pig recovered entirely.

2. Injected pig with 0.32 grains in heart. Pig died almost instantly after injection.

3. Injected pig intraperitoneally with 1.6 grains. Pig lived, showing no deleterious symptoms.

4. Injected pig intraperitoneally with 1.6 grains immediately after pig had received a six-second exposure to the X-ray. Pig lived, showing no deleterious symptoms.

5. Injected pig intraperitoneally with 3.2 grains. Pig acted normal for about five minutes. He then showed loss of equilibrium and breathed with great difficulty. Completely recovered within an hour.

APOTHESINE USED

1. Injected pig with 0.08 grains in heart. Pig died within a few minutes, showing a general weakness.

2. Omitted, because above was sufficient to kill pig.

3. Injected pig intraperitoneally with 1.6 grains. Pig showed slight symptoms of general weakness, which increased until one half hour later when pig died.

4. Injected pig intraperitoneally after a six second exposure to X-ray with 1.6 grains. Pig lived showing no deleterious symptoms.

5. Injected pig intraperitoneally with 3.2 grains. Pig died soon after injection, struggling a great deal before expiring.

You can calculate though not exactly, the tolerance a certain patient may have by estimating the dose you would give if the blood pressure were normal. If that pressure were 50 but is now only 25, you would reduce the dose one half. If it were only 25 you would reduce it three quarters. Take, for example, a patient with a broken compensation. Just at the break, your patient's circulation lost 50 percent of its efficiency; just how much afterward is hard to determine. This calculation of course, cannot be considered accurate, but it might

be used as a basis of reasoning in the administration of anesthetic drugs.

CONCLUSION

1. We should awaken to the fact that we are sometimes dealing with life and death and that we must share the responsibility with the physician and general surgeon in cases of common effort, and think in terms of medicine and surgery and be able to diagnose.

2. That serious cases should be treated in the hospital where a good intelligent record can be made to aid us in forming judgments that will protect and benefit the patient and where emergency remedies are at hand.

3. That one of the chief dangers is in dealing with a circulation whose heart muscles are weakening and pressure lowering.

4. That when we find for instance, a heart and circulation going wrong and associated with renal failure, or nephritis, we are dealing with a case that is probably the most dangerous, not so far as immediate danger is concerned but insofar as fatality is concerned as an end result.

5. That the hypertrophied heart is not always the dangerous case.

6. That the object in the removal of focal infected teeth is to establish drainage and that we should see to it that drainage is maintained in serious cases.

7. That the pulse pressure properly measured is a guide to the safety of operation on cases and that when the systolic and diastolic pressure approximate each other it is a counter-indication for local anesthetics and shock.

8. That opening the antrum is not good practice and may lead to a serious infection.

9. That to facilitate the removal of a badly infected and deep-seated impacted third molar by the removal of the obstructing second molar in front and above it, in patients past fifty-five years of age, is better surgical treatment than to put them in danger of fracture at that age.

10. That novocain is safer than apothesine. And that the pigs dying from apothesine died of a general weakness, indicating that it should not be used in low pressure cases.

Time will not permit its discussion but by a greater effort on our part we can assist in an earlier detection of a beginning myocarditis and extend the lives of many people particularly where it is caused by oral focal infection.

IMPORTANT PRINCIPLES OF PROPHYLAXIS AS REGARDS
PYORRHEA

BY J. P. CARMICHAEL, D.D.S., MILWAUKEE, WIS.

(Written for THE DENTAL SUMMARY)

I AM DISPOSED TO BELIEVE that pyorrhea is preventable. This finds conviction in the fact now definitely proven, that dental pyorrhea is primarily of an infectious nature. Present knowledge of the causes that produce infection, makes it possible by the adoption of stringent prophylactic measures, to protect the teeth and gums from the harmful effect of bacteria. To accomplish this would perpetuate sound teeth and healthy gums from childhood to old age. When this state of perfection has been reached, scientific knowledge will have added at least ten years to the span of human life, as well as providing old age with the joy of living.

Our artificial modes of living, the misconception of the public, and the indifference or the inability of many dentists in recognizing the real conditions that exist in the mouth, will require the weight and influence of the profession for years to correct the many evils that do exist. There are, however, some fundamental principles that all dentists should recognize, that would apply not alone to the treatment of oral diseases, but would as well guard against the recurrence of predisposing causes. The practice of dentistry means the saving of teeth; and over half the patients we are called upon to treat present pyorrheal infection in some form; if then we are capable of recognizing true conditions, the procedure is more wisely determined.

Based on my observations and experiences in active practice, dealing with all kinds and conditions of dental pyorrhea, I have no hesitancy in making the statement that "pyorrhea is absolutely curable." This does not mean that we can cure all the teeth in any particular case, for all time, as there may be, in any advanced case, a number of teeth beyond salvation; i.e., those where the disease has advanced to the extent of involving the dental pulp placing them in a different class and to be dealt with accordingly.

An important factor is to recognize pyorrhea in all its varying types and different stages of development; therefore we should have a clear understanding of the causes that are operative in producing this particular diseased condition.

Not until pyorrhea has attained a chronic condition are some dentists willing to admit its existence; and it is just those very dentists who enter most numerous complaints concerning the difficul-

ties of its treatment. *Obviously a disease that in its chronic form, manifests loose teeth and a flow of pus, certainly has a more innocent antecedent condition, constituting an earlier stage of the disease.*

Those who have followed Dr. W. F. Dunlop, of New York, closely in studying the effects of bacterial invasion of the gums, are able to see conditions that occur in the early stages of dental pyorrhea that heretofore have passed unnoticed; hence, they were never recognized as a condition of pyorrhea.

Unfortunately those earlier stages were regarded as innocent affairs and totally disregarded, or palliatively treated at the most. Hence the primal infection steadily advances to the chronic stage. The recognition of pyorrhea in its incipient stage waits upon an accurate observation of its existence and progress, and this development is in most instances practically uniform, the various structures being involved in orderly succession, beginning in the soft tissues.

If we are willing to acknowledge that pyorrhea has its origin from an infective process resulting in an inflammatory condition of the soft tissue enveloping the teeth, then the important consideration is how best to eliminate those conditions that have a tendency to encourage bacterial activity.

From clinical observation I have noted without variance that all pyorrheal processes are preceded in the early stage by gum infection. This infection at first manifests itself in a localized area of inflammation, which, we know, is accompanied by edema and edema makes for a lessened resistance. The swollen tissue opens the way for further infection which travels along the line of least resistance to parts of lessened vitality, namely, the alveolar bone and peridental membrane.

Many of those serious systemic conditions caused by pyorrhea may readily be obviated if we but learn to promptly recognize the local condition in its earlier stages, when remediable measures are of most avail.

Bearing in mind that the gums in every instance are the seat of primary invasion through which the inroads of pyorrheal infections are made, we should strenuously guard the health of this vitally important tissue. A healthy gum safeguards against a pyorrheal condition.

Statistics show that nine adults out of ten show either diseased teeth or gums and with our present knowledge of the origin of disease we must regard an unhealthy mouth a constant menace to the entire system.

All inflammation is due to bacterial activity (except it be contusion and all germs propagate in a suitable culture media, in which they become active, and emanate toxins. Here we have the begin-

ing of our destructive process. When we take into account that there are one hundred and fifty isolated germs known to be active in diseased gum tissue, we at once realize the difficulties in combating this mixed infection.

Did you ever lift an old, rotten board, lying on the ground, and see the insects and vermin scamper for cover? They never leave the inhabited area but begin to dig in where nature will soon incrust them with old mother earth. We may liken this unto a diseased tooth which we are to disturb in the gum tissue, the gum badly inflamed from a deep-seated infection that has been progressing for years. A good surgeon would clean up the field of operation, and after the operation would use a surgical dressing to protect the wound from re-infection. It is the general practice for dentists to extract teeth, remove calcareous deposits, and otherwise injure the gum tissue, and provide no treatment other than a simple mouth wash.

Were it not for the abundant blood-supply in the gum tissue, dentists would find themselves in trouble very often. It is fortunate that these operations are confined to the oral cavity. Although nature will help out to a great extent, dentists are not justified in curretting teeth and leaving an exposed root surface, and a wounded gum tissue without protection.

Personally, I would prefer to leave a coating of lime-deposit over the exposed root surface when present, rather than to scrape the root bare and leave it without suitable protection. There is no harm in this deposit above the gum line if it could be kept clean, but, of course, it is apt to harbor bacteria. However, if after virulent inflammatory conditions subside, the root is then curretted, the area involved covered with a surgical dressing that will protect the exposed root from thermal shock and the gum from reinfection, the sensitive conditions that usually follow these operations can be avoided.

For the removal of these soft deposits, the first step is to provide for the patient's home use a preparation that will, by mechanical means, free the teeth and gums from the clinging matter that encourages germ activity. The next few days will show a marked improvement in the inflamed gums and instrumentation may then be conducted with a fair degree of impunity. However, so long as the inflammation of the gum remains, there will be thrown out below the free gum margin, a serous exudate that clings to the root surface that will gather and retain infectious matter beneath the loose gum; the neck of the tooth should be kept free from this clinging matter, until all inflammation has subsided.

We cannot think of removing the infectious matter that keeps on accumulating beneath the loose inflamed gum margin about the teeth by the ordinary means of a tooth brush, and it does not help to apply the ordinary tooth powders and pastes which, in many cases,

actually add a culture media to the already infected area. Any sugar or gelatinous material in tooth pastes, when once dissipated of their antiseptic properties by the fluids of the mouth, help bring about or increase the very condition we are seeking to eliminate. We thus lend aid to the infectious process we are trying to prevent, for these same substances left behind after the use of a gelatinous paste, may for all practical purposes be considered as a culture media. Under these conditions the inflammatory and diseased conditions are aggravated and no mouth wash here applied is sufficiently penetrating to destroy any except the most superficial organisms, and much less capable are they of washing away the sticky deposits.

It is practically an impossibility for a patient to maintain a healthy condition of the mouth by means of a tooth brush and powder or paste alone, and this is more particularly true where the gums have been previously involved; for immediately after pyorrhea treatment the gum does not adhere firmly about the teeth. Although the gingiva will grasp tightly about the neck of a sterile tooth, the gum is more delicate and far more easily invaded by the germs of disease than in the prior normal condition.

Bearing in mind these observations regarding the importance, the origin and nature of the beginning of infections in the oral cavity, and more specifically in the gum tissue, we will now lend our interest to the ways and means by which those infections can best be prevented.

Many are the ways that have been devised to accomplish this end, but not all have met with the same success. Either the methods in themselves were wrong or the materials used were harmful and defeated the very end for which they were employed. This state of affairs strikingly suggests the great need of more uniformity in following a course of prophylactic measures.

So inadequate has been the result obtained in former years in prophylactic treatment for the prevention of diseases of the oral cavity, that it became quite evident that the need of radical changes was imperative. If then, we are willing to concede that bacteria must have a culture media to cause infection of the gum, and that infection causes inflammation, and that inflammation is a forerunner of pyorrhea, the logical principles that would constitute the correct treatment would be to remove the physical disturbance without injury to the living tissue.

It is important that the patient be instructed in the proper manner of brushing the teeth. In this connection it is advisable to demonstrate the rotary motion by which the bristles of the brush are carried beneath the loose margin of the gums. If then the proper dentifrice is used the desired result will be obtained. The dentifrice should be of a soluble nature. Ingredients leaving a residue serve

only as a culture medium and aggravate the conditions you want to overcome. If you employ as a dentifrice a soluble organic base that will dissolve out and free the teeth from the accumulation of infectious matter—the real agent of disease—you will be more certain of a satisfactory result. I submit the following enumerated essentials comprising important physical measures as regards the care of the teeth.

A preparation containing soluble organic substances that will free the teeth and gums from those deposits that harbor bacteria;

A preparation that will mechanically remove the infectious matter without injury to the natural enamel luster;

A preparation containing ingredients that will stimulate the natural flow of secretions from the gum tissue, nature's own prophylactic fluid;

A preparation containing an antiseptic that will protect all exposed tissue from re-infection at the same time stimulate and aid the healing process;

A preparation that can be rubbed beneath the loose gums, and between the teeth, that will readily be washed and dissolved away in rinsing the mouth;

A preparation that leaves the mouth with an agreeable sensation of cleanliness;

A preparation that, by physical means, releases all infectious matter and can be used as often as the teeth may require cleaning.

A soluble disappearing tooth powder, used dry or with dampened brush comprises the ideal dentifrice. A study of tooth texture will fully demonstrate that this, the only measure that will enhance the brilliancy of the teeth by polishing them, must be applied dry. It must also possess a resistant property that will give them their proper lustre. Tooth texture possesses a quality of viscosity that makes it capable of being burnished. This is best accomplished by an inpalpable powder used dry or upon a slightly damp brush. In this connection it will be found that the use of a tooth napkin is even more effective than brushing, for in using them, the patients, through squeezing and pressing the gums, will force out from beneath the loose gum margins deposits that are not reached by the tooth brush. As the tooth napkin is applied with the fingers it enables the patient to thoroughly clean the molars on the tongue side where it is impossible for some to use a brush. For children's and babies' teeth it is not only far more beneficial but the ease with which it is used will strongly recommend it to mothers.

The dentist must insist upon the patient following the requirements that are indicated which may necessitate several prophylactic measures, for after a cure the big problem is to prevent recurrences. The natural tendency of the patient is to continue his usual habits

and in a short time the same conditions that caused the disease in the first place, prevails, and in a few months the patient returns with disease as bad as before treatment.

In conclusion I wish to emphasize the importance of using both the tape and tooth napkin, which provide a friction that will enhance the brilliancy of the enamel and stimulate the circulation in the gums, and this is akin to nature, where we find that the friction caused in the vigorous mastication of food is nature's way of keeping the teeth clean and polished.

The adoption of those prophylactic measures that would constitute the correct home treatment of the teeth, would not only mean more permanency in dental operations, but would make for far better results in the prevention and cure of pyorrhea.

SHOWING THE METHOD OF SPLINTING FRACTURES OF THE MANDIBLE WITH METAL*

BY B. S. ROTHWELL, D.D.S., CLEVELAND, OHIO

WHEN A FRACTURE presents itself you always will find the areas of the jaw badly swollen and the parts distorted. The teeth will be out of articulation upon the fractured parts either forward or backward or laterally of their proper occlusion.



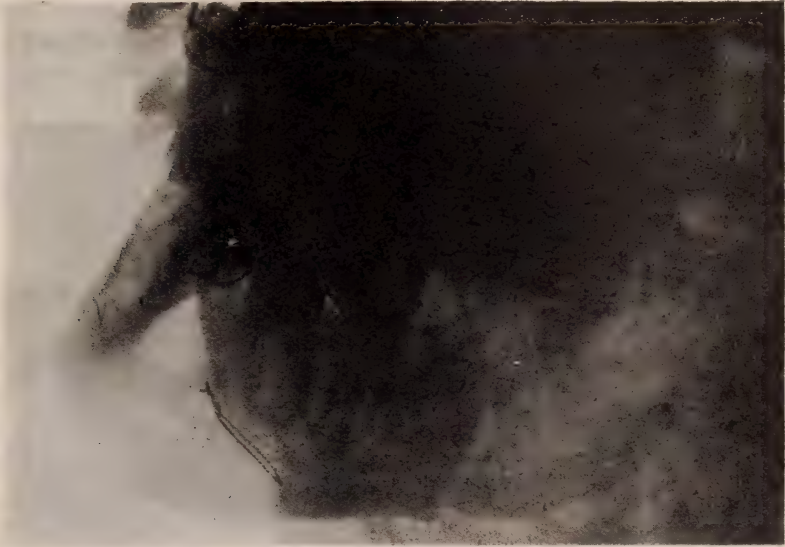
TO REDUCE SWELLING AND PAIN

These parts should be put at rest as soon as possible. Take a modeling compound or plaster impression, using vaseline upon the teeth and gums; preferably S. S. White's base plate compound.

Pour the molds with Spence artificial stone.

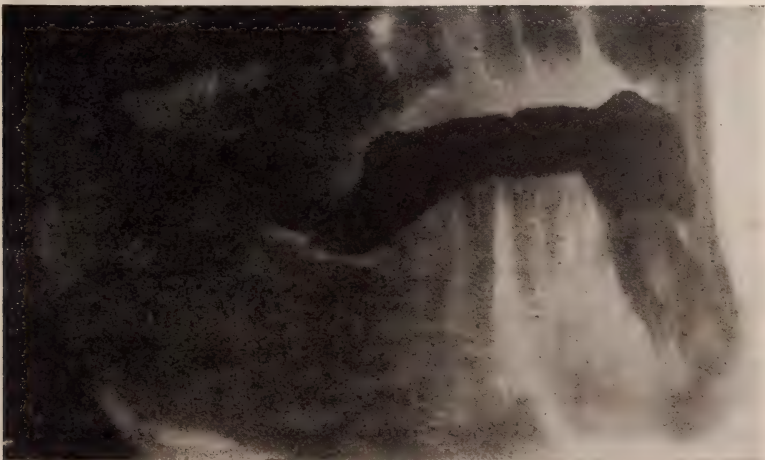
*Given as a Clinic Ohio State Dental Society, Dec., 1921.

To put the patient in a more comfortable position while making the splint, I ligate the fractured parts together with orthodontia wire interproximally; this will hold them as quiet as possible until the final splint can be produced.



MODELS

These are then broken through the areas corresponding to the fractures of the mandible. These parts are then articulated into position as to their occlusion with the upper or lower as the case might be. Then re-cement these parts as they are in their proper position.



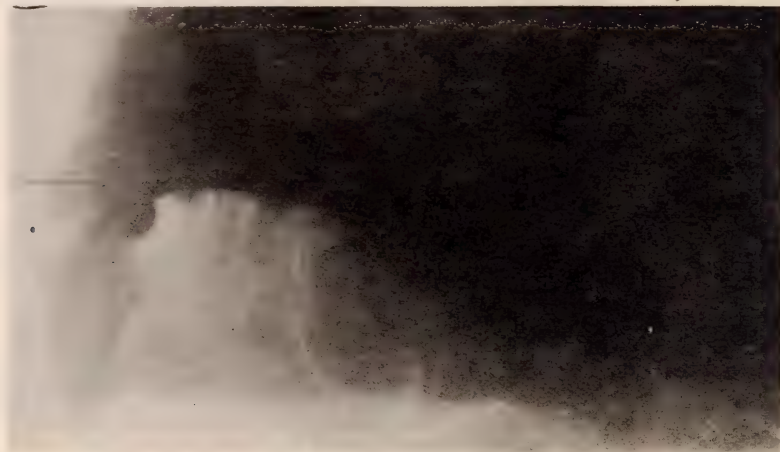
METAL SPLINTS

Make up your wax pattern, taking in as many teeth on either sides of the fracture as you can. Invest and cast with silver.

TO SET SPLINT

Remove the orthodontia wire that was holding the parts temporarily. Try in the metal splint for adjustment as to the gum margins and areas that might have been changed through swellings or infections.

Prepare the teeth by washing them with alcohol and keep them as dry as possible with gauze. Mix your Ames' copper cement and place this into your splint, placing the splint over the teeth with your fore-



fingers and your thumbs under the jaw on either side, forcing the fractured areas into position. Then have the patient close his jaws tightly together, holding this position until the cement has thoroughly set.

During this procedure where the patient would suffer considerable pain in setting the jaw, I use the dental inferior injections of novocain.

After the patient relaxes, his jaw retains its relative position as to occlusion and after forty-eight hours he can again use it for masticating purposes held in position by this firmly cemented splint.

CLEANLINESS

The patient can keep this splint clean and sanitary by use of tooth brush and mouth washes.

The swelling subsides rapidly, infection of parts can be handled easily when fractures are at rest with proper drainage, if necessary.

These splints can be kept in the mouth for any length of time according to severity of fracture without damage of deterioration or bad effects upon the teeth.

636 Rose Bldg.

PROLONGED NITROUS OXID-OXYGEN ANESTHESIA: TECHNIC OF ADMINISTRATION AND CASE REPORT*

BY EDGAR W. SMITH, D. D. S., KANSAS CITY, MO.

EVERYTHING I HAVE TO SAY in this paper is based on practical experience in giving this anesthetic for the last seventeen years. The manner of giving it has changed many times during this period, but the results sought for have been the same from the start.

The first point to consider in an anesthetic is *safety*.

I think it has been thoroughly established and is known by all of us that oxygen among other things makes all nitrous oxid anesthetics safer. This being the case, I give every patient oxygen with the nitrous oxid. I do not wait until the danger signs appear before turning it on, as I feel that it can do no harm to any of the patients; therefore, I give the oxygen from the very start of the anesthetic, at least 5%. Next to safety in importance with me is comfort to the patient. Giving at least 5% oxygen from the start is giving your patient more real comfort than anything else you can do. The nasal inhalation is the only thing which equals it in giving comfort to your patient; then, the little exhaling valve always left open also adds to comfort.

Before I began using the nasal inhaler and giving oxygen to every patient from the start, fully ninety per cent of my patients complained that while they felt no pain from the extraction, that they had a most terrible smothering sensation; also, they come out with headaches frequently, and suffered with general exhaustion for sometimes twenty-five or thirty minutes afterward.

*Read before the Special Session on Anesthesia for Oral Surgery and Dentistry, during the Joint Meeting of the Mid-Western Association of Anesthetists and the National Anesthesia Research Society, Kansas City, Mo., October, 24-25, 1921.

The reason patients have more pleasant sensations on going under the anesthesia with the mouth open and uncovered as is the case with the nasal inhalation, is perhaps psychological; yet, there is no question but your patients will be less nervous and will feel that they are at least not going to be smothered. About the worst sensation one can experience is to try to exhale when the exhaling valve is closed and the bag is full of gas. It is just as bad a sensation as to try to inhale when there is nothing to inhale.

I have seen men give gas by covering the mouth and nose tightly with exhaling valve closed tight, the bag full of gas and more coming in all the time, and wonder why the patient struggled. They don't struggle long, though. They soon suffocate to unconsciousness, and any operation can be done painlessly, but they are not anesthetized; they are inflated.

Rebreathing is quite necessary in many cases, and with the delicate little spring in the exhaling valve, a little rebreathing is done at every breath, which is very advantageous. When you want your patient to rebreathe, start when the lungs are full of gas and the bag empty, so that when he exhales the gas can go into the bag. The gas should be turned off while rebreathing is being done. The gas that was in the lungs is now in the bag. Next, breathe back into the lungs and the bag is empty. Then, when you have done that for only a few times, open the exhaling valve and turn on the gas, and proceed with the anesthetic.

Next to comfort I place *relaxation*.

I place this last because in my work it comes last. I would rather know that my patients were safe, know that they had a comfortable induction of the anesthetic, and know that they were not going to feel pain, than to know that now they were perfectly relaxed and would hold still while I extracted some teeth. Of course, it is very desirable to have your patient relaxed and perfectly quiet while operating, and we try to and do accomplish this in the majority of cases; but teeth can be extracted with patients yelling and fighting and not relaxed at all. If to quiet them down is going to lessen safety or comfort, better be inconvenienced yourself.

There are very few patients indeed who cannot be anesthetized and rendered perfectly quiet and relaxed. The method of rebreathing referred to above will quiet most any of them, and if done judiciously adds to the safety of the anesthetic rather than detracts.

In describing the technic of administration, it is necessary to say that I use a Heidbrink machine. When the patient takes the chair, or table, as the case may be, the cylinders are open and the dials of both oxygen and nitrous oxid are at zero. The exhaling valve on nasal inhaler is open; air valve closed.

First step: I turn on oxygen to five per cent "dot", and nitrous oxid dial to "dot" or ninety-five per cent gas. The center valve is now turned open to "dot". I now adjust the mouth prop. I have previously determined where I wish it, and as I do so the nurse gently places the nasal inhaler in place, accompanied by some such reassuring remarks as, "Miss Blank, you will find this a very interesting and pleasant experience, if you will just relax completely and breathe naturally through your nose."

The average patient will go to sleep in about one minute. Before starting to operate, I turn the center dial around about half way between "dot" and "force" which causes the gas to flow faster than they normally breathe, and the excess comes out of the mouth; so that if in case the patient started breathing through the mouth while you were operating they would only get the surplus gas and would not likely come out. I would not have you think for one moment that giving gas with this or any other machine was simply a matter of "dots", "valves", "arrows", "minutes", etc. All of these are based on the average requirements, such as the number of square inches of pressure in normal respiration, the number of gallons per minute of air breathed, by average person, etc., and therefore, we can give more uniform anesthetics; but one must understand the various symptoms and the physiological effects of the two gases, as well as have a thorough understanding of the general principles of anesthesia.

In prolonged anesthesia, if the operation was not in the mouth or throat, the nasal inhaler could now be exchanged for the face inhaler. The same per cent oxygen can continue for perhaps ten minutes, (depending on the patient of course), when it can be increased to, say 8%, and so on as the anesthesia proceeds, more oxygen can be used and the patient still remain in the operating state.

I will now give you a report of a case which was held under this anesthetic for six and one-half hours, with one intermission of thirty minutes at the end of two hours. The patient, a lady who was pregnant, had received a severe injury causing the death of the foetus, as well as a terrible misplacement of the whole abdominal organs, requiring a very long and very accurate and difficult operation. It was decided that ether would not be safe for such a long ordeal, and at the lady's suggestion I was asked to give her nitrous oxid-oxygen, having given her several anesthetics previously for a broken arm, teeth extraction, etc.

The gas was given in exactly the manner described above. The oxygen being increased a few points every twenty minutes or so until along toward the last, she was getting 17% oxygen. Altogether, this anesthetic required 850 gallons of N_2O and 250 gallons O . In

about 30 seconds after the inhaler was removed, the patient was fully awake, laughing and talking, with no nausea, in two weeks left the hospital and is in perfect health today.

INVESTING INLAYS*

BY GEO. H. MEANS, D.D.S., LOUISVILLE, KY.

CLINICAL INSTRUCTOR UNIVERSITY OF LOUISVILLE DENTAL DEPARTMENT; MEMBER LOUISVILLE INLAY UNIT
(Written for THE DENTAL SUMMARY)

THERE ARE THREE GREAT advantages in the method of double investment of inlay patterns over the single investment method.

First: It inspires care. While it is probable that in a test case an exponent of the single investment can produce as smooth an inlay as the exponent of the double investment method, still the writer believes that the average dentist, in his routine of practice, investing the wax patterns of his practical cases, will have better results with the double investment method, because the painting of the wax pattern with the first investment naturally instills the idea of infinite pains.

Second: The writer believes that the utmost density is desired in the investment which is in contact with the pattern proper. Yet were the cup filled with investment so dense the casting in it would be poor or missed entirely because of a lack of porosity, for the escapement of air. Therefore the necessity of having a mere coating of dense investment to contain the mold from which the air can escape, provided the rest of the cup is filled up with a very porous investment and the more porous this filler is the better—provided—

Third: That a crucible be formed of the dense first investment. After the pattern is coated with the first investment to the desired depth, the sprue should be covered its entire length to a diameter of a quarter inch and the dense investment then further extended over the crucible-former to a depth of one-eighth inch. Then after the cup is filled up with the porous investment and allowed to harden and the sprue former removed, there will be a crucible of the dense investment similar to the clay crucibles for sale at the supply houses.

The writer's objection to the ready-made clay crucible is that it does not allow for a perfect seal in casting with a direct air-pressure machine.

Furthermore, in burning out the investment the clay crucible becomes loose and it is believed that in the vacuum machine there is a leakage of seal out under the clay crucible.

Furthermore, that for use in the centrifugal machine the ready-made clay crucibles are not properly shaped.

Therefore, the advantage of the self-made dense investment crucible which has none of these three faults and has the great virtue of concentrating the force—be it pressure, suction or centrifugal, at the sprue hole by resisting the flow of air down the sides of the investment.



Fig 1

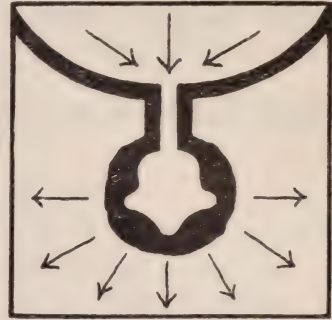


Fig. 2

In *Fig. 1* we have a diagram of a pattern single invested—the investment being necessarily porous allows the air from the direct air pressure machine, to pass through all parts of the investment, as indicated by the arrows, which lessens the concentration of force behind the gold as it takes exit through the sprue hole. The same idea reversed applies to the vacuum machine in regard to the “suction.”

In *Fig. 2* is shown our dense investment covering our pattern and forming our crucible chamber all in one piece, and without joint or leak.

This layer of dense investment resists to a marked extent the escape of air from the crucible chamber down through the investment at the sides of the mold, which concentrates the force, as indicated by the arrows, at the sprue hole, while the air in the mold escapes laterally in all directions upon the entrance of the gold.

One redeeming trait of the centrifugal machine is that this leakage of air needs but little consideration.

The Louisville Inlay Unit presents the following formula for a simple, ideal, dense investment:

1lb. Kerr's Snow White Plaster.

1lb. No. 27 Silex.

2½ dwt. Powdered Graphite.

Sift six times through flour sifter.

Give 2½ dwt. to 30m. of water in eye-glass.

Press eye-glass against ball of thumb and shake for 15 seconds.

Paint on pattern with very small camel's hair brush.

This is also the ideal investment for cast-clasp and Carmichael attachments or anything to be cast directly on models, in which case strength is desired during the working stage.

To fill up the cup around the first investment this Unit recommends Imperial Crown and Bridge Investment, because of its hardness and extreme porosity. Mix thin for this purpose.

1347 Beardstown Road.

WHAT SERVICE SHOULD WE EXPECT FROM SYNTHETIC PORCELAIN?*

BY DR. W. L. DAVIES, MILFORD, DEL.

IS SYNTHETIC PORCELAIN a restoration in a tooth, or a powder and a liquid? Perhaps too many of us think only of Synthetic Porcelain as we buy it, rather than as we use it. Synthetic Porcelain is not a powder and a liquid. The liquid alone is not Synthetic Porcelain; the powder alone cannot make a restoration.

Let us think of Synthetic Porcelain, for the purpose of our study tonight, not as a powder and a liquid, but as a dental restoration.

When we open a box of Synthetic Porcelain let us realize that we have a material only partially manufactured. We must combine this powder and liquid under proper and definite conditions in order to produce a restoration that will simulate the natural appearance of the tooth, and permanently restore its function.

The character of our Synthetic Porcelain restoration depends perhaps as much upon our skill in mixing and inserting as upon the technical skill with which the powder and liquid have been manufactured.

MANUFACTURE

But before we take up the study of technic let us learn something of manufacture.

Synthetic Porcelain is not merely a combination of ready-made chemicals obtained from manufacturers of so-called "pure chemicals." Its manufacture begins with the making of pure chemicals from raw materials. These chemicals are all prepared in the Caulk Laboratories. Even the purest chemicals that can be bought—chemicals marked C. P. or U. S. P. by the most prominent chemical manufacturing houses—are not pure enough to use in the production of Synthetic Porcelain. And this degree of strict purity is not by any means a useless refinement. Without this strict purity we could not have the permanent, clean, unfading shades and the enduring resistance to oral fluids, both of which are such important factors

*Read before the North Carolina State Dental Society, 1921, by J. C. Watkins, Winston-Salem, N. C.

in successful dentistry. Supreme purity of all constituent materials must therefore be understood as of vital importance to us; but we may for the present purposes, accept that fact without elaborating upon details of manufacture.

This practical importance of purity may easily be demonstrated by examination of the untinted powder known as shade one. This shade produces an absolutely pure white, translucent mix. If this untinted shade should be of even slightly inferior purity it would come out not pure white, but oyster white, or even darker.

You have undoubtedly observed that shade number one of ordinary silicates, intended to be pure white, is often not white, but contaminated with yellow or gray. Even the slightest impurity in the basic powder makes pure whiteness impossible and any shade other than pure white makes natural blending of colors impossible all through the whole range of shades. Impurities may also cause defects in the appearance, strength and permanence of the restoration.

The name Synthetic Porcelain was adopted because it denotes the fact that this material is built up as a result of synthesis from elementary compounds. The resulting product is a chemical porcelain.

CHEMISTRY

The chemistry of Synthetic Porcelain is extremely complicated. Neither the powder nor the liquid are simple compounds, and when the powder and liquid are combined the chemistry becomes still more complicated. To discuss chemistry in detail would take us, for this reason, too far from our subject; that phase of the subject may better be left to the professional chemist. We, as dentists, are more interested in the nature of the powder and liquid of Synthetic Porcelain and in the main chemical reactions which take place in our part of the manufacturing process, on the slab.

The powder of Synthetic Porcelain is basically a silicate of aluminum and calcium. Other compounds are present, known as modifiers, which are added for their physical effect rather than for their chemical effect.

Next to oxygen, silicon is by far the most abundant element in the earth's crust. It is not found in the free state but always occurs as silica, SiO_2 , or as silica in combination with various basic oxides—that is to say, silicates. The purest natural form of silica is quartz, or rock crystal; which forms beautiful transparent and colorless six-sided prisms, terminated by six-sided pyramids. These crystals have great hardness; they scratch glass almost as readily as the diamond does.

Silica is present in the shining outer sheath of stems, grasses, cereals, and in the joint of the bamboo. Many natural waters,

such as the geysers of Iceland, contain large amounts of dissolved silica. Pure water has no solvent action on silica in its natural form. To make silica soluble it must be fused with an alkali such as sodium carbonate, which converts it into a silicate. When silica is fused with sodium carbonate and lime it makes glass; sometimes other substances, such as lead oxid, are added.

The solution obtained by dissolving sodium silicate in water is known as soluble glass, or water glass, familiar to us as liquid sillex. When this solution is treated with an acid the silicic acid is precipitated in the form of metasilicic acid, H_2SiO_3 . This compound is simply silica, SiO_2 , and water, H_2O . Other forms of silicic acid are also known; or instance, ortho-silicic acid, which is H_4SiO_4 formed with one molecule of Silica, SiO_2 , and two molecules of water, $2\text{H}_2\text{O}$.

The silicates form by far the greatest number of minerals and they are derived from various polysilicic acids, which are compounds of silica, SiO_2 , and water, H_2O , in different proportions.

The chemical formulae for natural silicate minerals are as a rule much more complex than we might believe. Manufactured silicates, such as glass and porcelain, do not have a definite chemical formulae.

The liquid Synthetic Porcelain consists chiefly of hydrated aluminophosphoric acid, which is skillfully balanced so as to form (in combination with the powder) a neutral translucent mass. By the term "hydrated aluminophosphoric acid" we mean phosphoric acid in which the hydrogen has been replaced by the element aluminum, and to which the proper amount of water has been added for hydration.

We have already learned that Synthetic Porcelain is a chemical porcelain built up from elementary compounds. It has the major properties of baked porcelain, with which we are all familiar. There is however a very important difference between baked porcelain and Synthetic Porcelain. Ordinary baked porcelain is made by fusing together impure compounds of the same general order as those that are used in Synthetic Porcelain; namely clay (or kaolin) and feldspar, sometimes with other additions, such as quartz, Bohemian glass and flint glass. Clay or kaolin is silicate of alumina; feldspar is a silicate of aluminum and potassium; quartz is silica; Bohemian glass is a silicate of potash and lime; and flint glass is a silicate of potash, soda and lead.

These materials when fused together at a high temperature produce baked porcelain, a material that varies widely in chemical composition, but which has more or less uniform physical properties, such as translucency, hardness and insolubility.

Synthetic Porcelain, on the other hand, is a chemical porcelain. The powder and liquid set through chemical interaction, when combined either at room temperature or at mouth temperature. In

other words, the *liquid* of Synthetic Porcelain acts as a flux and takes the place of the *heat* which fuses the baked porcelain. The liquid also brings about the hardening of the mass by chemical interaction, and is, however, a very important difference between baked porcelain and the resulting product thus has substantially the same characteristics as baked porcelain—translucency, hardness and insolubility.

We should remember that the powder of Synthetic Porcelain is not merely a mixture of basic compounds, such as silicon dioxide, aluminum oxid, and calcium oxid with other chemicals. The product made by fusing these elementary compounds at high temperature is cast while molten into plates, and cooled. In this state it has the appearance of translucent opal glass. (Exhibits specimens.) Note the remarkable translucency and density.

This glasslike porcelain is then crushed, ground and separated by rather complicated processes which continue for several weeks.

Perfect filtration of the liquid is one of the essential processes of manufacture. Look through any bottle of Synthetic liquid—you cannot detect even the slightest trace of suspended matter. Not only is the liquid itself most carefully balanced and purified, but the very glass of the bottles is made from a special formula, so that there can be no chemical reaction between the bottle and its contents.

EARLY SILICATES

Several dental cements of the silicate type were in limited use before Synthetic Porcelain was introduced. We can see now that this early period was really a time of experimentation; the manufacturers were experimenting in their factories and we of the dental profession also experimented in our patients' mouths. This lack of definite knowledge resulted in a combination of defects which for a long period restricted any general use of silicates. We can see now that the introduction of Synthetic Porcelain about twelve years ago, brought about something of a revolution in dental filling materials. The manufacturers of Synthetic Porcelain not only gave us a material which had been studied and tested in a thoroughly scientific manner, but they also gave us an equally definite and scientific technic for its use. The result is that at the present time we not only have succeeded with simple restorations such as fillings, but we are confidently proceeding through a wider range of new uses.

TECHNIC

Technic for Synthetic Porcelain differs from the technic for any other material whatsoever. This is so because Synthetic Porcelain itself is different from any other material. Synthetic Porcelain technic is not difficult, but requires merely that we adhere to a few general principles. In order to make this clear we shall now give a descriptive outline of a practical case, following the modern methods of procedure, which are based upon wide clinical experience.

First we must note the accessories that are needed. Stellite instruments for placing; Stellite spatula for mixing; celluloid strips, cocoa butter, cavity lining and a heavy glass slab, and other accessories.

IDEAL MIXING CONDITIONS

Keep a plate-glass slab and Stellite spatula exclusively for mixing Synthetic Porcelain. An opalite slab, being opaque white, does not permit us to make correct blends with the lighter shades of Synthetic. Keep the slab absolutely clean, and observe its temperature. Synthetic Porcelain can be used successfully within a rather wide temperature range. The suggestions that the manufacturers make regarding cooling and warming the slab must not be construed as rigid rules, but rather as indications of the best method of obtaining ideal mixing conditions.

Successful restorations can be made with Synthetic at all normal temperatures, but mixing conditions are ideal when the slab is between sixty-five and seventy degrees Fahrenheit. If the slab is too cool we are apt to mix too much powder in proportion to the quantity of liquid. The mix will then be, to that extent, unbalanced, and setting will be too slow. If, on the contrary, the slab should be too warm, say about one hundred degrees Fahrenheit, then we will not be able to mix in enough powder to make a proper balance, and setting will be too rapid.

When we cool the slab we must be careful not to chill it down to the dew point so that moisture will condense on it. Never mix on a moist slab. After the slab has been washed and adjusted to the proper temperature, then dry it and apply alcohol to remove smears, grease or organic deposits from the surface. Cleanliness is the first requisite for good work.

SPATULAS

The spatula must be of Stellite or agate. Never use steel (or so-called "Stainless Steel"), or bone ivory, or tantalum, because any metal spatula, other than Stellite will discolor the mix. Bone or ivory spatulas are readily abraded by the Synthetic powder and microscopic semi-organic grindings of the bone or ivory become incorporated in the mix, interfering with its strength, translucency, and color. Tantalum spatulas are also prohibited because they are too soft; they discolor the mix.

Stellite is the only kind of metal spatula that does not discolor the Synthetic powder and which does not become abraded. The Stellite spatula is strong, bright as silver and especially designed for use with Synthetic Porcelain.

BLENDING THE SHADES

Select the desired shade before isolating the tooth, or teeth, from saliva. A dry tooth is opaque. If we match a dry tooth our filling

will be too light. First try to select the shade by means of the Synthetic shade guide which duplicates many tooth shades precisely. To match all other shades, and especially the difficult shades that require blending of two or more powders use the Shade Charts. Use your regular tooth shade guide just as you would use it if you were selecting a porcelain crown, a facing, or a vulcanite tooth. You may use either the incisal half or the cervical portion of these shade guide teeth. When you have found the right shade, then consult the Caulk Shade Chart which corresponds to your shade guide. These charts are made for use with the Twentieth Century, S. S. White, Consolidated, Justi, and Ash Shade Guides. It is well to remember, however, that on these charts there are two blending formulas for each single specimen on the tooth shade guide. One formula in black figures corresponds to the incisal half of the shade guide teeth. The other formula in colored figures surrounded by a circle corresponds to the cervical portion. This method gives us twice as many blends as there are specimens on the shade guides. But we must be careful to remember that the terms "cervical" and "incisal" have nothing to do with the position of our cavity. We may, if we wish, match the cervical third of the natural tooth with the incisal half of the shade guide tooth. The blending formula on the chart then reproduces that portion of the shade guide tooth which we have selected. We need not go into details on this point—we can study the shade charts later during the discussion.

CAVITY PREPARATION

A perfect filling requires a well prepared cavity.

Isolate the tooth from moisture by using rubber dam. If rubber dam is not used, then wipe the gum tissue dry with grain alcohol and apply two coats of Cavity Lining to prevent seepage. Place cotton rolls or napkins under the lip; adjust Hare Mouth-Prop and saliva ejector.

Make all cavities retentive, with square margins. Never bevel the margins as in cavity preparation for gold fillings. Remove all overhanging thin walls.

If, while a new filling is being inserted, there are any older Synthetic fillings within the area which will be kept dry, these older fillings must be protected against desiccation. Coat them with Cavity Lining. The tooth must be dry. Remove the decay, and also the stained dentin, if this is possible without injury to the pulp. Sterilize the cavity thoroughly—anteriors with colorless germicides. Do not use essential oils. A solution of thymol in alcohol is a splendid medium. If the cavity is deep, use Caulk Pulp Preserver, a preparation which contains thymol and pure zinc oxid, especially free from arsenic. This preparation is an efficient germicide and analgesic, and forms a pro-

protective resistant wall over the pulp preventing pressure. Many pulps are injured because the dentin yields while the filling is being packed into place. Pulp protection wherever possible is a fixed requirement of modern dentistry.

Dry all shallow cavities with alcohol and warm air, and apply two thin coats of Cavity Lining to its floors and walls. Do not use cotton pledgets to carry lining to the cavity. Cotton absorbs too much fluid, so that shallow cavities are often flooded and margins covered.

If the margins should be so covered, allow the Cavity Lining to dry and then go over these margins with chisels, or smooth stones, to prevent faulty adaptation of the Synthetic Porcelain restoration. A better way to coat the cavity interior is to bend a small loop on the end of a smooth broach. This loop carries a small globule of lining which can be applied to almost any cavity with ease and still leave the margins untouched.

Never dip anything into the bottle. Tip the bottle over and back. This deposits lining upon end of the cork. Take your supply from the cork; never from the bottle. This prevents dried accumulations on the cork and neck of the bottle.

THE MIX

Having selected the shade, we are now ready for the mix. Assemble slab, Stellite spatula, Synthetic Porcelain, plastic instruments of Stellite, tantalum or agate; celluloid strips or matrices, cocoa butter and cavity lining. Have everything clean and ready.

Never expose either the powder or the liquid on the slab until you are all ready to mix them at once. Place the desired amount of powder on the right side of slab and then stopper the bottle. Agitate the liquid with the dropper, place three small drops on the left of the slab, return the dropper to the bottle, and twist the cap to seat it securely. This is very important, because if the cap is loose, water will evaporate out of the liquid, and you will begin to wonder why your fillings set too slowly. Always protect the liquid against contamination and evaporation both in the bottle and on the slab.

Begin the mix by drawing the first portion of powder (half of the total quantity) into the liquid. Begin to spatulate immediately. Do not merely stir with the end of the spatula, but hold it nearly flat on the slab and spatulate with a circular movement. After this first portion of powder is thoroughly incorporated, add successively smaller portions until the mix reaches correct consistency. Scrape up the whole mass and place it back on the slab again. Do this several times, and spatulate thoroughly so as to make the mix homogeneous—all of the same texture or consistency throughout the mass.

Proper consistency can be judged by spreading the mix across the slab with the spatula. In this plastic state the mix does not spread

smoothly under the spatula. It breaks into soft, curling ruffles as the spatula moves over it, and the surface glaze is just disappearing. It resembles a thick putty. Moreover, when you pat the mix with the spatula, and raise the spatula slowly, the mix rises a little and then breaks short. It does not string out.

The time of mixing is vitally important. Never take over a minute and a half to arrive at proper consistency. Over-spatulation causes slow setting and results in a weak disintegrating filling. A good plan is to make a few experimental mixes, timing them with your watch in that way you can become proficient in making a mix of standard consistency within the minute and a half. Ordinarily, the working time available for filling and contouring is one minute. Temperature and humidity may cause slight variation in working time.

Take a small quantity of the mix, cover the cavity floor and walls thoroughly. Then add sufficient of the mass to fill the cavity slightly to excess, working the material towards and against the margins.

When the celluloid strip, or matrix, is indicated, fit it into position, fill the cavity, then draw the strip around the filling. Hold it *firmly for three minutes*. *Never burnish* over the strip; burnishing interferes with crystallization and sometimes causes a line of demarcation. Cocoa butter applied to the strip is not necessary. As soon as the filling has set initially, release the pressure and the strip will spring away from the surface of filling. Coat the filling immediately with cocoa butter that has been melted on a warm instrument.

The immediate application of varnish should be avoided because the surface of the filling may be dehydrated. The evaporation of the solvent causes a cooling of the surface sufficient to cause condensation moisture. The cocoa butter is used to prevent the loss of water from the surface of the filling and to prevent moisture from coming in contact with it.

Do not attempt to remove the excess Synthetic or to finish the filling before ten minutes have elapsed. Do not use chisels or cutting instruments to remove the excess; damaged margins are sure to result. Use fine stones, disks and strips, well lubricated with cocoa butter. The cocoa butter prevents heat generation by friction, which would cause bleaching of the filling and a roughening of the surface. When finishing must be completed at the same sitting always work *toward* the filling. This is just the reverse of the practice for gold fillings. After final contouring and finishing has been done with finest cuttlefish disks, a beautiful polish can be obtained by using Caulk Dental Polish applied with hard felt wheels. Use just a trace of the polish. Overloading the wheel or disk makes polishing slower rather than faster. If the filling is not to be finished at once, but

at a subsequent sitting, coat it with cocoa butter, as advised a moment ago. Then wait ten minutes, remove excess butter with a dry pledget of cotton, and coat the filling with cavity lining. Never neglect to use cocoa butter on abrasives even though the filling is to be finished subsequently. Isolation from moisture, however, is not necessary when finishing is to be done at a later sitting.

NEW USES

Synthetic Porcelain is used at the present time not only for fillings in certain restricted cavities, but also for combination gold inlay and Synthetic fillings, window inlays, open-face crowns, Synthetic Facings, Synthetic Jacket Crowns, and for tip and corner restorations.

COMBINATION INLAY

The combination gold inlay and Synthetic filling is indicated where an incisal angle is very thin and occlusion close, together with marked attrition, so that any porcelain would need reinforcement.

Prepare the cavity as for a gold inlay. Make a wax impression, carve it, and then cut away the labial surface deep enough to form a simple cavity or recess. Make the casting with any of the casting golds or clasp gold alloys. These resist flow and abrasion much better than pure gold.

After the inlay is cast and cleaned, make undercuts, with small inverted cone burs, for proper retention of the Synthetic Porcelain. Then carefully finish and polish the inlay and cement it to place.

The gold backing will make Synthetic Porcelain appear a little more yellow than it really is. Therefore make your blended color a little more bluish gray than the exact match.

WINDOW INLAYS

In the case of Synthetic window inlays, the procedure is the same as for the combination inlay, except that the lingual face of the inlay requires an opening or window to be cut through, of whatever size may be indicated. This window effect gives us full translucency and permits accurate matching of the tooth. It also serves to increase the anchorage, or retention for Synthetic.

OPEN FACE CROWNS

Open Face Crowns are indicated where an all gold crown would be too conspicuous. Make the gold crown complete; then cut away the labial surface and cement the crown to place. Remove the excess cement and make undercuts all around the opening of depth sufficient for good anchorage. When necessary, reinforce the incisal tip of the crown with solder. Use a Synthetic Facing Form to mold and condense the labial contour.

SYNTHETIC FACINGS

Synthetic Facings to replace broken porcelain pin facings on bridges or Richmond Crowns, can be made by molding Synthetic Porcelain with Facing Forms.

Facings that are durable and of beautiful appearance can be made easily within fifteen minutes. Select a Facing Form as nearly as possible of the correct size and cut it from the strip, leaving a little tab or handle on the incisal angle long enough to facilitate handling.

If only one pin remains in the bridge backing, scarify the backing surface with a right-angle chisel or a wheel bur, for better retention. If the backing has a reinforced incisal tip, undercut it with a small inverted cone bur. If the pins are missing, replace them with two gold screws (Steele's) or with the Jackson tee screw.

Remove all pieces of broken facing, clean the surface of the backing with alcohol, place a cotton roll under the lip, wipe the gum with a pledget of cotton saturated with alcohol, and coat it with two applications of Cavity Lining.

Fill the Facing Form with Synthetic Porcelain of proper shade and press it to place with your finger. Hold it with firm pressure for four minutes and allow the excess to squeeze out where it will. After four minutes remove the strip and coat the Synthetic Facing with cocoa butter. Wait ten minutes and then dress the facing to proper contour and occlusion. You will usually find that very little contouring is necessary. Finally coat the facing with cavity lining, and dismiss the patient.

SYNTHETIC AS A CEMENT FOR JACKET CROWNS

When using Synthetic to cement baked porcelain jacket crowns, deflect the gingival tissues from the neck of the tooth with gutta percha, and wipe the gum dry with a cotton pledget saturated with alcohol. Then apply two coats of cavity lining to prevent seepage, place a cotton roll under the lip and adjust a Hare Mouth Prop (anterior), which aids in keeping the cotton roll in position, holds the mouth wide open, reflects light into the mouth and leaves both hands of the operator free. Make a mix of the proper shade, to a consistency slightly thinner than rich cream, and cement the crown in the usual way.

SYNTHETIC JACKET CROWNS

Use of Synthetic Porcelain is being rapidly extended to include large contour restorations, and the technic for manipulating large masses for full crowns and large contours has led to the development of the Caulk Crown Forms. These are celluloid shells, transparent and flexible, yet sufficiently strong to resist considerable tension without tearing or distorting, and they now constitute a valuable adjunct to good practice.

Preparation of the tooth for a Synthetic Jacket Crown differs but little from that for the ordinary baked porcelain Jacket Crown. Instead of obliterating the cavities, use them for retention. Remove all labial and interproximal enamel to slightly below the gum line,

if decay has progressed to that extent. If the enamel of the cervical third of the tooth has not been affected it need not be removed. In other words, in the preparation of the tooth remember that two features are demanded, a definite "shoulder" and an "abutment." The well-prepared shoulder is a firm seat, giving additional strength to the Synthetic Porcelain and maintaining the surface alignment with the root.

Cut the shoulder at a slightly acute angle from the cervical margin. Leave no thin edges. The abutment should be planed or dressed down to the depths of the shoulder, with a gradual taper toward the incisal, about two thirds of the length of the crown. Round off the incisal corners. This preparation is applicable to posteriors as well as to anteriors; it offers the greatest support to Synthetic and permits the strongest construction of the crown.

If the abutment is perfectly smooth, cut slight grooves at right angles across the anterior surface. This gives better anchorage. Preserve the pulp whenever possible. When the tooth is *alive*, apply two coats of cavity lining to prevent possible irritation.

Select a Crown Form as much as possible like the tooth to be restored. The flexibility of the celluloid allows considerable latitude in adjustment. If general dimensions are correct, but if the tooth-end is too large, slit the Form a trifle; then lap and seal it with Caulk Solvent, which will dissolve the celluloid strip and weld the lap firmly. If the Form is too small, cut as before, place the Form on the abutment, and bridge the open space with a small piece of celluloid strip, coated with Solvent. Then trim the Crown Form for desired length and gum contour.

Puncture both incisal corners of the Form with a smooth broach or explorer. These holes act as air-vents, preventing pockets and flaws in the crown. To insure perfect cleanliness wipe out the interior of the Form with a cotton pledget that has been dipped lightly into alcohol.

Dry the gum tissue with a pledget of cotton, saturated with alcohol, and apply two coats of cavity lining, which will prevent seepage. Place a cotton roll under the lip and keep the mouth open by means of a Hare Mouth Prop.

Mix the Synthetic to the shade selected. Consistency should be slightly thinner than for fillings. Fill the Crown Form full; work the Synthetic well down into the incisal corners. Remove the mouth prop, press the Crown firmly to place and have the patient close immediately, so that the incisal-lingual contact will be well established.

Hold this contact for five minutes until the initial crystallization has taken place. In the meantime smooth the Form down with your finger, sliding it once over the labial wall, from incisal to

gingival. Then use a thin plastic instrument to adapt the Form perfectly on the proximal surfaces, pressing it to place with one or two firm wiping strokes from the incisal to the cervical. Don't burnish.

Excess Synthetic Porcelain will squeeze out from under the Form at both incisal punctures. This excess serves as an indicator by which the initial set can be determined. When this excess is hard enough to snap off with a clean fracture, then open the mouth, replace the prop, coat all excess with cocoa butter, and wait ten minutes. Then trim off all excess, and apply cavity lining wherever the excess has been removed.

The patient is now ready for dismissal. Instruct the patient to be cautious, not to bite down upon the restoration with undue force for at least one hour. The Form need not be removed for several days, and it should be left on, if possible, for not less than twenty-four hours. When you want to remove it simply slit it on the lingual surface and peel it off.

Finally, the contouring and polishing should be done. Cervical margins can be quickly and correctly finished with a Caulk Amalgam Instrument, L, which is a specially designed file. Lubricate it well with cocoa butter. If the enamel-like gloss of the Synthetic is marred by finishing, it can be quickly restored by using Caulk Dental Polish with hard felt wheels—only a trace of polish is necessary.

TIPS AND CORNERS

The technic for tip and corner restoration is very similar to that described for Synthetic Jacket Crowns, except that we cannot use a complete Crown Form. The tapering neck of the Form will not go over the bulbous incisal third of the tooth. The Form must cover the incisal angle completely, and come well over the cavity margins. Make an air vent corresponding with the position of the cavity.

It is extremely difficult at times to secure good incisal anchorage for corners and tips. Clasp metal, or gold-coated tungsten wire, make the most suitable metals for pin or post anchorage for Synthetic Porcelain. Nickel, platinoid, or similar base-metals cannot be used without danger of discoloring the restoration. Several inches of twenty to twenty-two gauge wire can be threaded for the entire length and small sections cut off as required. Eighteen gauge, or sixteen, may be used in devitalized teeth where the pulp chamber and canal can be made use of, but larger posts are not suitable. Because of their bulk they weaken the restoration rather than strengthen it.

Anchor the pins into sound dentin, in such position as will afford greatest strength and least injury to the tooth and pulp. Cut the wire long enough so that the protruding end will be firmly imbedded in the filling. These small pins do not interfere with the translucency

of Synthetic Porcelain, but care should be exercised in their placement. See that they are covered over thick enough to prevent chipping and they will not shadow through.

GOLD FOIL*

BY A. E. BIBLE, D.D.S., URBANA, OHIO

WITH THE FACT IN VIEW that my subject, "Gold Foil, the Time and Place for its Use", as the subject to be presented to the very modern practitioner, will be considered antedated and uninteresting, but I offer no apology for presenting to you this subject at this time.

Gold is to-day, undisputably, the most noble of all metals that has ever been developed by science through past ages, barring none. It is this metal which, by its sheer virtue, gave birth, maintains and supports the old adage, "*as good as gold.*" That it is such we all agree; then why is it discarded in disgrace? Is it true that the working of gold filling is a lost art?

There are two principal reasons *why* gold foil has been discarded as a filling material: *First*, and *justly*, the appearance of gold as a substitute for tooth structure that does not blend or harmonize with the tooth structure; for that reason it is objectionable. *Second*, it is generally considered to be difficult, tedious and time-taking to construct all fillings that would be made of gold foil. For the sake of appearance and good taste, I shall admit that such fillings as would involve any portion of the labial aspect of teeth may be made more closely in harmony with the tooth structure.

Now such cavities as involve the *lingual*, *buccal*, *occlusal* and a certain type of *labial* and *incisal* cavities, where the filling is not easily apparent, I maintain should be made of such material as we *know* will render to our patients the greatest degree of service, irrespective of effort.

It is my candid opinion that at least *fifty per cent* of the so called porcelain fillings made to-day are *not* made because it is more to be desired by the operator or patient or that there is any objection to gold. It is because of the fact that we have drifted into the *habit* of making the fillings of other materials for no other reason than that it is more easily and quickly done, and through mercenary, selfish and indolent reasons we have continued to use this imaginary excuse until we have fallen a victim to our own illusion.

We all know only too well just what the average synthetic filling looks like after two years in the mouth of the average patient;

*Given as a Clinic Ohio State Dental Society, Dec., 1921.

such a filling involving the *occlusal* of bicuspid and molars or the *buccal* of the same teeth; and just what the gingival fillings, particularly the lowers, resemble in such a time; then there is left only the last type, the incisal; and there we know it can stand the strain only for a short time, to say nothing of the discoloration, and that wonderful little circle at the margins that invariably makes its appearance in this type of filling, to haunt and remind us that we too are profiteers and slackers from hard and honest efforts.

Now that we are aware of this condition, and knowingly *go on*, then are we not malicious traitors to our friends who have entrusted to us the preservation of their money, health, teeth and happiness? Then we will say: "Well, what is the right thing to do?" *It is this.* I have always maintained and sincerely supported "the practical and consistent thing" whether it be *focal infection, X-ray, wholesale exodontia, alveolectomy, or gold-foil fillings.* For those cavities conspicuously apparent use synthetic filling, and for those *back of anteriors, involving approximal and mesial or distal, use cast gold inlays.*

In the type I have mentioned before, as *buccal, lingual or occlusal*, and a certain type of *labial*, I advocate GOLD FOIL.

Now, I shall try to explain to you the method I use in such procedure, and shall prove to you that it is neither difficult nor tedious; and I assure you that the patient will be in your chair no longer for a gold foil filling in the average cavity than to do the same operation with synthetic porcelain. I will admit, however, that one *must* understand the nature of cavities, margins, and the particular instruments, the kind and conditions of foil to be used; it *does* require some experience and a certain amount of skill.

I claim no originality as to methods or technic.

A combination of the wedging and rotary system with the old-style hard-gold automatic mallet system is used. You will notice with but few exceptions every type of cavity is known as the four-wall type. Let us use, as an example, an occlusal cavity in the right upper bicuspid, using an inverted bur, for excavation. Usually when excavation is finished, cavity is ready for filling; if not, finish with square walls with a general undercut. I do not like the use of a wheel bur at any time. After the margins have been squared up take a small tapered fine pointed stone, beveling edges. No retention pits are necessary. Then select as small a pledget of cut cylinder foil, preferably Hood's plastic, S. S. White's Corona or Keeton-Williams. Mat gold is used by many. Select as large a piece of gold as you can use conveniently in the cavity. Use as large a round rotary hand plugger as will fit the cavity; press pledget into place with a firm rotary movement. At this time use gold unannealed; then use a smaller pledget annealed, and start to wedge it around the walls with the spiral.

rotary hand plugger that will fit the case; using unannealed gold, lapping over the margins down into the cavity, using a firm rotary motion; then using smaller pledgets and hand mallet to finish filling, medium shank or Varney No. 29. Fill up well over the margins, burnish with heavy egg burnisher, remove dam, stone or disk down.

This work can be done with a little experience of operator and assistant in from 25 to 30 minutes, including setting, finishing, etc., So much for the gold filling with no waste of time for material to set, no chance for moisture to cause future but positive failures. This technic is simple and positive. Years of service under my observation satisfies me of its efficiency. This is not over-drawn in any sense.

Your fees can be adjusted in comparison to services rendered your patient. I am sure you can conscientiously charge and your patient will readily pay a larger fee, thereby increasing your income through better services, which is right and proper. Fees, however, have a bearing on this subject but should be taken separately.

Many of the rotary style pluggers are to be had. I find six instruments fill my entire need and the same number of automatic pluggers are sufficient. I have tried the gas, electric and different forms of annealing but nothing seems to be quite as good as the pure grain alcohol flame properly adjusted and each piece of gold annealed for its particular use. Too much annealing and unsteady hand cause more grief than any other thing.

I cannot understand how any conscientious, honorable dentist, who is abreast of the times, in face of the facts, can be true to his conviction, his professional self or patients, can continue to substitute in this type of cavities. To me it is only equaled by the man who crowns teeth unnecessarily for the sake of the dollar. I firmly believe that gold foil has a place and a very important place in the preservation of teeth, and it is sure to return to mother the old adage,—AS GOOD AS GOLD.

HISTORY

Arculanus, who died in 1484, is said by Guerini in his History of Dentistry, to have been the first writer who alludes to the use of gold leaf for the filling of teeth.

Guerini also says that in a book printed in Leipzig in 1530 there is a reference that would seem to indicate that Mesue, who was physician to Harouin al Raschid, speaks of a method of filling decayed teeth with gold; but he adds that he (Guerini) had been unable to find such a statement in Mesue's writings as far as he had read them.

Fauchard, the great French dentist who is commonly regarded as the founder of modern scientific dentistry, used tin, lead and gold. He preferred tin to lead because it was more durable and because lead turned dark so quickly; he preferred it to gold because gold was

"so dear that not every one can or will make the corresponding outlay."

Just when gold was first used as a filling material in America is difficult to determine. Certainly Dr. James Gordette was one of the first. He was born in France, came to this country in 1778 as a surgeon in the French naval forces sent over to help in our Revolutionary struggle; he afterward resigned his commission and adopted this country as his home. In 1783 he began practice in New York, but removed the next year to Philadelphia, when he continued in practice until 1829. Harris said that the use of gold for filling teeth did not become common until about 1800.

It is probable that for a good while the dentists used gold leaf, a much thinner form of gold than that now commonly known as gold foil. That in gold foil is the partially-beaten gold before it becomes thin enough for leaf. There is another important difference. Gold Leaf is made of 22-K gold; gold foil of 24-K pure gold. Marcus Bull began the business of gold beating in Hartford, Connecticut, about 1812 or 1813. Gaining some knowledge of the requirements of the dentists he gradually got some of them to use his partially-beaten gold leaf. In 1816 he removed to Philadelphia, where in 1835 Charles Abbey who had been his apprentice in Hartford, became his partner, and eventually his successor. About the time Abbey became a partner the firm stopped making gold leaf, the demand for foil from the dentists affording sufficient business. Abbey made a preparation of "soft" foil, that dentists whose practice dates back to the time when they could obtain it, will tell you was entirely different from any of the so-called soft foils of other makers. It could not be made cohesive. If there was a secret about it the secret died when the Abbey family went out of the manufacture of gold foil.

Until 1855 all the foil used in filling was known as "soft foil", what we now more correctly call the non-cohesive variety. In that year Robert Arthur, a dentist of Philadelphia, who by the way was one of the two graduates of the first class of the Baltimore College of Dental Surgery, discovered the advantages of the cohesive property of gold in building fillings. The new method, because it made much denser, more resistant fillings, rapidly superseded the old in the hands of most dentists; so much so, that a recent writer claimed that filling with so-called soft foil was almost a lost art, although in the hands of one who understands soft or non-cohesive gold and its use, a filling can be built up considerably more rapidly. Some excellent dentists use non-cohesive gold to form the base of fillings, especially those that extend below the gum margin, because of the greater facility with which they can work it there, and then build up their cohesive fillings on top of the soft gold.

THE HALL METHOD OF PLATE WORK*

BY DR. T. A. WILKINS, GASTONIA N. C.

IN my clinic this afternoon I shall endeavor to explain to you the technic in the construction of a full denture by the Hall Method. This morning I am going to take up what I consider the most important requisites in the construction of dentures. I am not going into details in regard to the examination of the tissues of the mouth and the mouth preparation, for Dr. Patterson explained that very thoroughly at our last meeting.

I believe that the secret of the Hall Method lies in the simplicity of the methods that go to build each step in the foundation of this work. When we hear of the results of plate work, we anticipate something marvelous, perhaps some secret discovered that has never been heard of. But such is not the case. The results, though not all that we could wish, are a well-merited reward for the life work of those men who perfected this system.

The first step, and the most important, in the construction of this work is getting the impression. I shall confine my remarks mostly to the lower denture; for this method enables us to get just as satisfactory results from the lower as from the upper. I have been giving this work special attention for the past five years. The only deviation I make from Drs. House, Tench, and Paterson is the first step in getting my tray for this impression.

I take an impression the old way, using S. S. White impression tray compound with an ordinary tray; run a model of plaster of Paris; and, by hastening the setting of this, I can get my tray from the model as soon by trimming down this impression as they do. The reason I do this is on account of the condyles. This model enables me to study the condyles better. In making my tray over this model I trim my model farther back than the condyles, and I let my tray reach farther back than need be. Then by warming this tray that extends over the condyles, one side at a time, using an alcohol lamp with mouth blowpipe, I place this tray in the mouth, holding it with one hand, and with the index finger of the other hand I press this compound closely around the condyles, chill and remove.

I rewarm this around the condyles, and replace it in the mouth. Now I cause the patient to do the moulding around these condyles by having him protrude his tongue as far as possible. This may be done repeatedly until you are satisfied that the muscles all have free action. We keep these condyles chilled. This enables us to place

the tray in exact position in the mouth, while we are shaping the periphery of the tray in conformity to the muscles and tissues of the mouth, which is done by warming the tray, as I stated before, with an alcohol lamp and mouth blowpipe. Place the tray in the mouth and hold it firmly with one hand; with the other hand catch the cheek and lips, pull them up, down, outward, and give them all the motions that they are subject to. Repeat this until you have a tray so closely adapted that there is suction, and then you will find little difficulty in removing the tray.

Now, in taking your impression you should know your impression plaster and insert this in the mouth just before it reaches its moulding stage. Then, as when fitting your tray, have your patient protrude his tongue. This moulds the impression plaster to a close and comfortable adaptation around the condyles.

To remove the impression, place your fingers on the outside of the cheek just below the tray, and push upward, or catch the cheek and pull upward to loosen the impression. Then catch it anteriorly, raise it a little, and push backward past the condyles, which frees it. Raise one side and then you can remove it without fracture.

So much for the impression for the lower plate. Now, the upper is much easier. Still we should be just as careful in getting our upper impression and use the nature of the case in getting our periphery of the denture that we are inserting to restore the lost parts.

I could write pages on this one step of this work, but there are several other steps just as important—getting the occlusal of the jaws, selection of the teeth, setting the teeth up, the things to take into consideration when you try them in, placing them back on the Hall articulator when finished, and grinding natural wear into them.

After we have our impression, we should run our models in artificial stone in order to get a model that is hard enough to preserve the periphery of our impression and carry this to the finished plate without danger of fracture. Then if we get our bite plates off of permanent model, we have nearly as good a fit in them as we have in the finished plate.

Next we build our wax on these bite plates to the fullness that we want our teeth, and we also get the length of our upper teeth with tight fitting bite-in plates. Let the patient go through all the movements of mastication at the same time we are judging our lip-line and the fullness of the teeth. We trim our wax accordingly. When we know that we have the proper occlusion, we take a warm spatula and seal them together in the mouth. Then, when we place them on the articulator, it is an easy matter to set them up properly.

You will find in this method of plate work that each step is a prerequisite to the one that follows, and that when you get your

permanent models, and your bite trays from this, you are enabled to perfect bite or occlusal of the jaws that you can get in no other way. This at the same time gives you the fullness and the length of the teeth. Now, it matters not what articulator you use. Any straight line articulator will do. I use the Hall. After I set my teeth up, I use carborundum and glycerin and grind a little wear into them before I try them in. When I have finished my plates, I have such a good articulation that it is not difficult to set them back on the articulator, where, by the use of carborundum and glycerin, I can grind a natural wear into them with the Hall articulator, and this is the only one I have ever seen where the teeth will occlude the same in the mouth as they did in the articulator.

There is no guess work in this. We know, and we see that every step is correct and that it can be proven correct. The greatest hindrance to the universal practice of this system of plate work is that it takes time and hard work. It seems that those who perfected this system tried to see just how much time they could put in on a plate. I am sure that I now put in ten hours to every one I put on a plate eight years ago. But there is some satisfaction in being able to tell your patient that you can give him comfort and service in a plate.

The same rules of health apply to a misfit in a plate that apply to a bridge that is unsanitary. The physicians of today are condemning many bridges as unsanitary. In my opinion, many plates, though serviceable, should be thrown away, for they are breeders of germs and unsanitary, to say the least.

The same technic especially in regard to impressions, models and formation of cusps, etc., that apply to this system of plate work, I use in bridge work, partial plates, and removable bridge and plate work. I think that it is the only way a perfect impression can be had.

PENETOLOGY

Conducted by WILLIAM A. LURIE, M. D.
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This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

The constant dripping of water will wear away stone. The constant absorption of any toxic material kills men. In neither instance is it necessary for the volume of the agent to be such as to be recognizable nor even perceptible. The only requisite is constancy. In the mouth there is always present the possibility of infection or irritation, and they exist over a long period of time, either as an infection or an irritation. The early recognition of an infection or irritation in or about the mouth, other than in the instances where acute and definite local symptoms can be recognized or described by the patient, is a difficult thing. Every possible aid in determining the extent of a process must be employed. Much that might prove of benefit or aid is lost in the lack of the knowledge of what to look for and where to look for it. Here again is the plea for a better

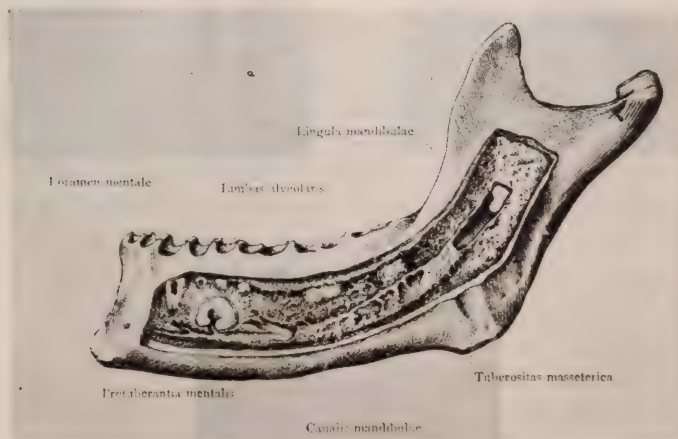


Fig. 1

(From Toldt's Anatomical Atlas) Lower jaw with outer table dissected away to picture Haversian Canals and their variations.

understanding of the normal in extent and position of each grade of penetographic shadow. In dental interpretations, the extent of re-

placement materials or preparations used in the treatment of cases plays an important part. This was explained in the last issue of *THE DENTAL SUMMARY*, and was given as the explanation of shadow of Grade 3.

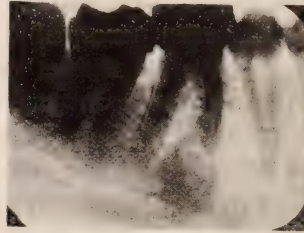
The most important shadow of interpretation, however, is shadow of Grade 2, both the A and B divisions. It will be remembered that shadow of Grade 2 A included bone of alveolar type, while Grade 2 B pictures denser bone and teeth. (Refer to early number of this series of papers.)

Fig. 1 is an illustration from Toldt's Anatomical Atlas, and represents a lower jaw with much of the outer table of bone removed. This illustration pictures the character of bone tissue about the in-

Fig. 2



A



B



C



D



E

ferior dental canal quite distinctly. The difference of the finer bone cells of the Haversian system which go to make up the crest of the alveolar process is not illustrated. These, however, are constantly

being pictured and can be seen in any of the illustrations in *Fig. 2*, as they are pictured penetrographically. From the crest of the alveolar process to the lower mandibular margin these cells assume a gradually larger size. Also from the median line backward to the ramus these cells show a gradual increase in size. This difference is easily pictured and often is discovered and at times mistaken for some diseased or pathological condition.

In this paper we will discuss the increase or decrease of shadow of the type of Grade 2 as illustrated by the cases pictured in *Fig. 2*.

The important change to note in A in Grade 2 A shadow is the condition of the alveolar process in the position of the first premolar. The socket from which the tooth was extracted is distinctly visible. This picture was taken a year and a half after the extraction of the tooth. The finding of a piece of amalgam as represented by Grade 3 shadow explains why this socket did not heal and continued to discharge. A well-healed area is pictured as in the first molar positions in D and E.

In B *Fig. 2* a condition from which the patient describes no symptoms is pictured about the mesial root of the first molar. This condition is sometimes considered a bone-whorl by some writers. It is a distinct increase in the depth of shadow of Grade 2 A, the alveolar type, and exists periapically. By carefully studying the distal root of this molar it will be noted that to a lesser degree, there is some bone thickening to be seen about this root. Because of a lack of history we can only surmise in many of these cases and guess their pathology and significance. *

In considering the possible significance of the condition here pictured it is perhaps a fact that the history would disclose that an early unsuspected infection of a carious molar was treated by one of the more powerful chemically destructive processes, and that the patient's resistance overcame both the infection and subsequent chemical irritation. The process in healing calcified, with the resultant formation of the area of denser alveolar process or bone.

Fig. 2 C is a wonderful illustration of the results of a long-standing low grade inflammation of a type which does not carry any infection and is in turn fairly well protected from the introduction of a foreign infection. As long as the crown on the second premolar protects that putrid pulp from infection and the thickened bone area, which nature has supplied, protects the pulp from an infection arising from the circulation, this condition is only a toxic one, and not an

*(This department will shortly undertake a canvas to determine the frequency with which these and many other conditions are to be looked for, also the significance their presence indicates. Your assistance in this direction is earnestly solicited. Should you have any cases of this or any interesting character your tabulation of them or reference of them to the Department of Penetology, c/o DENTAL SUMMARY will be appreciated.)

infection. However any attempt to remove this putrid pulp would most likely begin a foreign infection of this entire area, in a tissue which is defensive against the toxic putrid pulp but defenseless against a microbic infection. This patient had been a sufferer for years with migrain. This tooth and the entire alveolar area were removed. The patient showed immediate improvement and later was entirely relieved.

The removal of the tooth without alveolar resection in this case would have proven disastrous. The thickened bone area would have proven no protection against infection and would have more than likely have been sequestered. If absorbed it would have continued the toxic obsorptive process for a protracted time and have delayed the cure.

D and E, *Fig. 2*, are two interesting pictures of cases in which portions of deciduous roots remained in the alveolus. These root portions were never absorbed nor exfoliated as is the general rule, but remained to become infected in later years. In E, this case came to operation. The case history and clinical appearance indicated a pyorrhetic pocket mesially of the second premolar, and it was urged for a long time that the second premolar be removed. After the above picture the root portion was removed. This cured the discharge, tightened and saved the tooth.

In picture, D and E, it will be noted the alveolar shadow between the premolars shows an irregularity in the presence of an area of denser shadow. This should approach the type of Grade 2 B rather than Grade 2 A, which should exist there solely. In picture E, a distinct shadow of lesser density than the surrounding alveolar tissue is distinctly visible surrounding the denser mass. This portion of the shadow approaches the appearance of soft tissue or Grade 1. It represents the extent of the necrosis caused by the infection. It is the extent of the soft tissue present in the area.

None of the cases here pictured are of the type of distinct, active infections or actively destructive infections; still they are of a type often seen but misunderstood. They comprise that vast number of cases where the infection or intoxication is slight, yet continuous.

PENETOIZED PARAGRAPHS

What is taking place in the structures of the mouth is problematical. The advent of X-Ray pictures (penetograms) has brought to light many interesting and unusual things. Man of this age should have a complement of 32 teeth in his second dentition. Many instances of the impaction and non-eruption of third molars are reported. The determination of what the ratio of this finding is, up to now has never been attempted.

The penetogram will reveal some interesting discoveries. Some have no third molars, some have fourth molars, some have other than molars impacted or missing. In a certain ratio of cases it will be found that bicuspidis are missing and will be found impacted somewhere. Supernumerary teeth are a surprising discovery. These are interesting findings—they are the more interesting because of their rarity—but are they as rare as we are led, in our individual observations, to believe they are? The gathering of statistical data of the character THE DENTAL SUMMARY plans to undertake may lead to many surprises. If nothing else it will help us in this age, at this time, to make our own determinations as to the stability or retrogression in the teeth of man of today. Any assistance you can offer, suggestions you might have to aid in the preparation of these statistics, cases you care to record, or your help in any and all ways, is asked. In a coming issue the entire plan will be outlined and your aid solicited. Be on the lookout for it. Sign the blank and send it in, and do your duty to yourself, your patients and your brethren of the scientific world.

Those simple extractions sometimes prove a serious stumbling block. They are not as simple as they appear to be. The penetogram is a wonderful indicator of trouble to be looked for, expected or avoided. How often, during a simple extraction, a root breaks off and then a hurriedly-made picture locates the missing portion and explains the cause of it all! It is much better in all extractions, therefore, to take a picture first than to wish you had after the trouble. A warning in time may save a serious error, much time, and Oh! so many tempers! Just think of the embarrassment of breaking a tooth when under up-to-date methods the scientific discovery of where and how to use the stress might have avoided it all. Think of the patient and the possibility of his wrath or of his change of desire to lose a tooth, when, in his mind, it was so solid that the roots broke.

No tooth ever should be extracted except after the patient is convinced it should be extracted. Most teeth extracted without the penetogram are extracted on suspicion and the case against them proven after extraction. A better patient, better operation and a better case in general is the result of the observation first by the penetogram, the showing to the patient the positive evidence of disease and cause of the extraction, and the final perfect operation—a pleasure to all. All extractions are not simple, many not complicated—yet a most simple one can be made a most difficult one because of the error of omission in the very onset of the case,—the omission of the penetogram. In a difficult case one can produce evidence of the necessity of a proper operation to be performed and how to

outline that operation, how far the infection has extended and how it should be treated to be properly cured.

Too many cases are left to "heal up" after tooth extraction in which there has really resulted in a "seal up" of infection to make itself known in later years. The penetogram gives warning of these conditions, how to avoid them and what to do when you find them. A wonderful help, and as one manufacturer of apparatus puts it "1% in the picture making and 99% in the interpretation." Learn to interpret the dental penetogram.

To Keep X-Ray Film Parallel With Tooth



A simple aid in preventing the curve of the palatal arch from tilting the film out of a position parallel with an upper tooth, is to place a section of a dental cotton roll of suitable diameter between the tooth and the lower part of the film.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO
(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultze Building, Columbus, Ohio.)

A Solution That Will Free a Dental Office From Objectionable Odors

Use a glass jar with a close-fitting glass cover. Fill the jar one-half full of alcohol and add a pinch of Diamond Dye to the desired shade. Put in Ammonium Carbonate (Squibbs Cubes) until jar is almost full, use a teaspoonful of oil of lavender or oil of violet and about a teaspoonful of ammonia.

Leave jar uncovered for a short time each morning.—*Dominion Dental Journal*.

Sterilizing Cavities

In the treatment of pulps where we have caries it is good practice to undertake to sterilize the layer of dentin with silver nitrate. We do not expose the pulp if we can avoid it, particularly in young subjects. We use twenty per cent. silver nitrate; this is painted on the affected tissue, being careful not to cover the entire cavity with it. The area painted is then exposed to electric light or sunlight for one minute and the silver nitrate neutralized with one per cent. sodium hydroxid. The cavity is then washed out and varnished. We then line the cavity with zinc phosphate cement and insert the permanent filling. This method of conserving pulps has proven very satisfactory.—O. G. L. Lewis, *Dental Cosmos*.

Making a Post for Inlays

Where inlays are made with posts in canals the following is an effective and easy method of making a post:

A piece of 30-gauge 22-k. gold, such as is generally trimmed off from shell crowns, is folded in double and twisted together with a pair of pliers. Small pieces of solder are flown into the spiral grooves to reinforce it by holding it over the Bunsen burner flame. When this post is placed in the canal, the inlay wax pressed over it will fill the loop hole of the twisted portion and attach it to the wax upon removal from the cavity, thus saving annoyance and waste of time, which is mostly experienced with a smooth post.

The spiral form is also more retentive when cemented in place.

—S. H. Siegel, *Dental Cosmos*

Oil of Turpentine for Hemorrhage

Mr. F. St. J. Steadman, in an interesting paper read before the Section of Odontology of the Royal Society of Medicine, and pub-

lished in the *British Dental Journal* for April 1st, advocates the use of oil of turpentine and states that over an experience of twelve years he has not known it to fail. The method of application is simple. The gauze is soaked in the drug and the socket packed; if necessary it is kept in place by stitching or by applying a pad over the gum and bandaging the jaws. Mr. Steadman gives notes of four cases in which the hemorrhage was severe. The patients were all women and in each there was a history of a liability to bleeding; the father of one patient had died from hemorrhage. The teeth were removed at intervals with great care and all went well until a canine was extracted. This bled profusely for several hours. The socket was syringed with cold water and packed with gauze soaked in oil of turpentine, and the bleeding ceased immediately.—*Dental Record*.

Open Loop Cast Clasp

The "basket" and "open-loop" clasp, favored by so many some years ago and again being revived since the cast clasp has come to the fore, may present difficulties in getting a wax pattern for casting

As a labor and time-saver, select a small hypodermic syringe, together with a hub having the needle broken off and enlarge the hole in the hub with a round engine bur. Remove the cap and plunger and fill the barrel with scrap inlay wax. Replace the cap and plunger and heat the syringe to proper temperature. Then with nozzle down, slowly force the plunger and the wax will come out in the desired round form, which can be reheated and easily adapted to the tooth cast.

The hole in the hub should be slightly larger than the desired gauge of the clasp so as to allow for finishing.—*F. S. Munn, Dental Cosmos*.

Spread of Dental Clinics

According to returns received in reply to a questionnaire recently sent out by the United States Bureau of Education, 286 cities in the United States have established dental clinics in connection with their public school systems. These clinics receive support in 181 instances from the city boards of education; in 33 from the city health departments; in 22 from health departments and boards of education jointly, and in 50 from the Red Cross or private donations.

Massachusetts outranks all other States with respect to number of cities maintaining dental clinics, laying claim to 34 of the total of 286; then comes New York State with 23, New Jersey, 21; Illinois, 17; Michigan, Ohio and Wisconsin, 16 each; Indiana and Pennsylvania, 14 each; California, 11; Rhode Island, 8, and the remaining States from 7 to 2 each.—*New York Times, [in Oral Hygiene]*.

EDITORIAL

AMERICAN CHEMISTRY MENACED

The United States entered the World War with no thought of territorial gains. Our active participation in the hostilities was a protest against world conquest by force of arms or otherwise, on the part of any one nation or group of nations. In the defense of this humanitarian ideal for justice and fair play, America contributed millions of dollars in money and hundreds of thousands of human lives. Victory meant neither huge reparations nor indemnities for the United States. In the division of the "spoils of war," we had no share.

One of the few compensations which this country received from the gigantic struggle was, a more or less definite assurance of security through the welcome discovery that our people might be able to depend upon themselves, in the future, for the production of many indispensables previously obtained only from Germany. Among the most important of these necessities, were dyes for our industries and medicinal chemicals for the sick. Necessity was the mother of invention and the father of research. Before the war, the United States was at the mercy of the German chemical trust. The great "I. G.," backed by the German government and operated under the German cartel system, had a strangle hold on the chemical industry of the United States, if not upon the entire world. Our industries and the medical profession were completely dominated by, and absolutely dependent upon Germany for dyes and certain medicinal chemicals.

Through a system of espionage, trickery, dumping and political propaganda, Germany held this country in a vise-like grip. To this monopoly, the American people meekly acquiesced and paid tribute in the form of exorbitant prices.

Soon after the great war opened, in 1914, the blockade brought us to realize that we must either develop our own organic chemical industry or be deprived of dyes and important drugs. For the latter, this was proved to be quite possible, as manifested by the fact that the Dermatological Research Institute at Philadelphia, for instance, produced a preparation of "salvarsan" that was equal, if not superior, to the German product.

The Chemical Foundation. It is well to relate why The Chemical Foundation was incorporated, and its purpose. It has been ex-

plained how Germany was obtaining control of the pharmaceutical industry as well as the dye industry of the world. The control of medicinal chemicals by one country might become, in time of war, as powerful a weapon as explosives or poisonous gas in the conscienceless conquest of the world.

This was the situation in 1914. Germany had misused our patent system. She had taken out patents for all her developments covering, in many instances, not only the processes to prevent manufacture here, but, also the products, to prevent our taking advantage of any possible development in the dye industry of other countries. Now, 4,500 of these patents, which applied to chemistry, were sold for the benefit of American industries by Mr. A. Mitchell Palmer, former United States Attorney General and former Alien-Property Custodian, to a corporation called The Chemical Foundation. This Foundation was organized to encourage the chemical industry of America, and not for profit. It was authorized to issue licenses to any competent, equipped and patriotic American individual, firm or corporation, on such of these patents as, with the help and encouragement of The Foundation, might be utilized in the promotion of American industry and for the use of the medical profession.

And, now, there are men in Washington who are pledged to represent American interests, but who are endeavoring to destroy the usefulness of The Chemical Foundation. If all patents were to be returned to the Germans, there would be wiped out, in a single executive order, the only fruits of victory which this country now enjoys. The Chemical Foundation has issued licenses to manufacture many important medicinal chemicals which heretofore had never been made in the United States. Among these products, familiar to the dental and medical professions, are Arsphenamine and Neo-arsphenamine, the American names for Salvarsan and Neo-Salvarsan; Cinchophen, known in Germany as Atophan; Procain, introduced as Novocain; Acriflavine; and Neo-cinchophen. Not one of these medicinal chemicals was made in the United States before the war. American firms, under license from the Chemical Foundation, and encouraged by that patriotic organization, have invested large sums in developing and producing these valuable drugs. Not only has The Chemical Foundation been interested in the success of American endeavor along these lines, but so also has the Council on Pharmacy and Chemistry of the American Medical Association. This body, which includes the leaders in medical, therapeutic and chemical progress in this country, has repeatedly urged the medical profession to use, and specify by American names, the products made in this country under license from The Chemical Foundation. All surplus funds, above 6% of the capital actually invested, accruing to The Foundation through license fees paid by manufacturers, were to be expended by The Foundation

for the development of research and the encouragement of the Chemical industry of the country.

The executives of The Chemical Foundation serve without pay. Its President, Mr. Francis P. Garvan, former Alien-Property Custodian, is a man of high ideals, of clear foresight, and is actuated only by patriotic motives. Under his direction and with the assistance of a devoted staff of associates, The Chemical Foundation has accomplished much for the advancement of the chemical industry in this country. It has brought about a closer union of the university and the factory, it has conducted surveys of the facilities in our universities for chemical research; it has brought about a standardization of chemical stains for research work; it has contributed twenty-five thousand dollars for the publication of research work done by the American Chemical Society; it has protected and guarded our growing chemical independence, and labored for the advancement of medical science and research.

The establishment of The Chemical Foundation is one of our greatest achievements of the World War. Its perpetuation will compensate, in a measure, those countless millions of American citizens who fought at home and on the field of battle to defend our flag and our right to freedom from foreign domination.

Notwithstanding the high patriotic ideals which have actuated the work of The Chemical Foundation and its friends, it is almost unbelievable to read, in our daily press, the attacks made upon its legality and right to existence and perpetuity.

Shortly after a recent visit to this country, by a German delegation, an executive order was issued by President Harding ordering, on the advice of the Attorney General, the immediate return of all German patents, by the Chemical Foundation, to the Alien-Property Custodian. Not satisfied with this executive order, the Attorney General instituted a criminal suit against Mr. Garvan, President of The Chemical Foundation, with subpoena for his appearance, with all books and records of The Foundation, before the Grand Jury.

This action, if not contested, might ultimately lead to the return of all German patents to the Germans and a serious setback to our infant American chemical industry. President Harding, it is believed, was not familiar with the real purpose and accomplishment of The Chemical Foundation, when he issued such an un-American manifesto. It is intimated that the President's political advisers have in mind "a million German votes" in this country; but, surely, no one with a conscience would wreck our growing chemical industry in this country for the sake of political patronage!

The Problem. The question is, "Have we won the war" if we now sacrifice the only benefit which we enjoyed for a time? Will

the American people stand idly by and let themselves be sold out in this way?

This emergency calls for action. It is as clear a duty to enter a protest now, as it was in time of war to enlist or to buy liberty bonds. If your senator or congressman does not stand up and fight for an American chemical industry, he is either misinformed or he does not deserve the support of American citizens.

Write or wire them at once and find out where they stand. Neither Mr. Garvan, nor The Chemical Foundation, nor any American chemist is going to submit to this indignity without a fight which will be carried to the Supreme Court of the United States, and even beyond it to the American people themselves. Morals are involved here, as well as fine points of the law, and it is your privilege and duty to let your senators and congressmen know where you stand.

Practically, dentists can aid in the movement favoring American made medicinals by specifying "Procain" whenever they order that remedy, forgetting that such a term as "Novocain" ever existed. Procain is distinctly American; novocain is an imported article.—*Condensed from an exhaustive article in The American Journal of Clinical Medicine, Chicago.*

THE LOS ANGELES MEETING OF THE N. D. A.

*Prepared for The Dental Summary by request by L. L. Barber, D.D.S.
formerly President N.D.A., Toledo, Ohio.*

The sixty-fourth annual session of the National Dental Association was held at Los Angeles, July 17 to 21 inclusive. It was one of the best meetings the Association ever held. In my judgment, it is a splendid thing to hold a meeting occasionally in an entirely different geographical location, for the stimulation that it gives dentists in that location. And, it is no further from Boston to Los Angeles, than it is from Los Angeles to Boston.

The registration this year amounted approximately to 4000. The attendance was somewhat handicapped owing to railroad conditions. The weather was all that could be desired.

Now, as to the business done at the meeting. First, there was the changing of the name to the AMERICAN DENTAL ASSOCIATION, and the re-incorporation proposition which places our organization on a firm basis in a business way, so that now we can carry out all the problems incident to the publication of a magazine and the handling of funds, feeling that we are on an equal footing with any banking institution, and yet we are permitted, under this law, to organize as a non-profit Association, which relieves us from any responsibility for the payment of taxes, and at the same time gives us the opportunity to hold meetings of the board of Trustees or of the Association in any State in the Union. In other words, we have incorporated our Association, duplicating in every respect the incorporation of the American Medical Association.

I doubt that we have ever held a meeting where the exhibitors were so unanimous in their statements that the Los Angeles meeting was one of the most satisfactory to them from the financial standpoint. Every foot of space was sold. Many of the sections reported the largest attendance in their history.

The next meeting, to be held at Cleveland, September 10-14, 1923, is looked forward to with great interest.

The election of officers resulted in the selection of John P. Buckley, Los Angeles, Calif., President; Wm. A. Giffin, Detroit, Mich., President-elect; John Stephan, Cleveland, Ohio, Charles L. Alexander, Charlotte, N. C., and W. D. Cudworth, Milwaukee, Wis., Vice-Presidents; Otto U. King, Chicago, Ill., Secretary; Arthur L. Melendy, Knoxville, Tenn., Treasurer. Doctors Boardman and Lucas were re-elected as Trustees, and Dr. J. F. Biddle was elected to succeed Clarence J. Grieves. Dr. E. C. Mills, of Columbus was elected Vice-Chairman of the Section on Operative Dentistry.

Dr. L. L. Barber was re-elected for five years on the Legislative Committee.

Doctors H. C. Brown and Lewis S. Meisburger were re-elected on the research Commission. Dr. G. A. Crise, of Manhattan, Kansas, will succeed Dr. S. P. Cameron, and Dr. G. Walter Ditmar, of Chicago, will succeed Dr. T. W. Brophy. Dr. Geo. P. Orr, of St. Paul, will succeed Dr. D. M. Galley, of Chicago. On the F. D. I., Dr. Herbert L. Wheeler was elected to succeed Dr. Thorpe, and Dr. L. E. Ford, of Los Angeles to succeed Wm. Carr.

One of the most interesting parts of the meeting was the Health Exhibit held in a tent on the Grounds of the Hotel Ambassador. A continuous moving picture program attracted many to the exhibit.

The outdoors entertainment at Hollywood Bowl consisted of a very wonderful musical program by a fine orchestra. Tom Mix, movie rough rider, gave an exhibition. Also there was a big Spanish Barbecue together with an unusual display of fireworks.

The ladies were cared for in a splendid way, and the Los Angeles boys certainly did more than could be expected of them to make the stay of the visiting dentists and their families while in Los Angeles an instructive and pleasant one.

The meeting was housed under the roof of the Hotel Ambassador. Clinics were many and very fine.

SOCIETY ANNOUNCEMENTS

The Susquehanna Dental Association of Pennsylvania

The Fifty-ninth annual meeting of the Susquehanna Dental Association of Pennsylvania will be held at Hotel Casey, Scranton, Pa., October 25th, 26th, and 27th, 1922.

George C. Knox, *Rec. Sec'y.*

Middletown, New York.

D. S. Gardner, *Chairman of the Executive Com.*
Scranton, Pa.

Massachusetts State Board

The Massachusetts Board of Dental Examiners will hold an examination October 3, 4, 5 and 6. Applications for this examination should be on file at Room 146, State House, Boston, at least ten days in advance of examination.

Very truly yours,

J. N. Cariere, D.D.S.,
Secretary

Michigan Dental Examination

The next examination to be held in this state for those seeking license to practice dentistry in Michigan will be held in the city of Ann Arbor, at the dental college building, November 13th to 18th, inclusive.

All further information may be had by addressing:

Dr. E. O. Gillespie, *Secretary*,
745 David Whitney Bldg., Detroit, Mich.

Alpha Omega Fraternity

There will be a meeting of the Alpha Omega Club of New Jersey on Thursday evening, September 21, 1922, at De Jiannes' Restaurant, 17 Central Ave., Newark, N. J. All members are welcome. An elaborate smoker and a splendid program have been arranged for the evening.

Henry H. Fingerman, *Chancellor*,
1 Alpine St., Newark, N. J.

CORRESPONDENCE

TO THE EDITOR OF THE DENTAL SUMMARY:

A worthy topic for your editorial pen is the matter of state board examinations. Why should a dentist, any more than a lawyer, be compelled to go through the agonies of a state board examination every time he wants to cross a state line and serve the public—especially when he must depend not only upon merit but also upon the humor of the board members? If he is qualified to practice in Indiana, surely it is an antiquated system which declares him unqualified to practice in Illinois.

A man who took the California board last time tells me that thirty-six out of thirty-seven graduates from the California school were granted licenses and the thirty-seventh was a Jap, and that only enough non-Californians got by to give it some semblance of fairness.

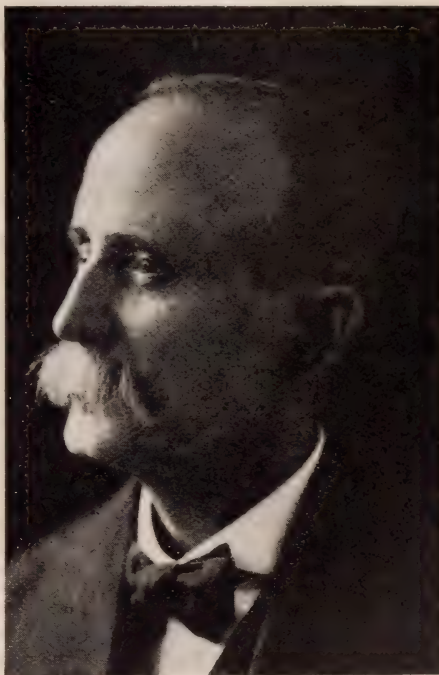
The State laws on State Board Examinations are thought by some to be unconstitutional, and I was told at the Los Angeles Convention, that one dentist had got a federal injunction against the Washington State Board of Dental Examiners. I cannot vouch for the truthfulness of the above but I do feel strongly the injustice of the present condition, having passed two state boards without any fear of flunking but at a considerable cost and effort for which there was no return.

(The above letter was signed by one of the best known dentists west of the Mississippi, and is published in the hope that it will bring out discussion on a subject that is of great importance, as evidenced by the fact that a dentist cannot move from Detroit to Toledo, for instance, without the nuisance of an examination no matter who he is or how able a practitioner he may be. Let's hear from everybody who has an opinion.—G. E. H.)

OBITUARY

DR. CHARLES H. LAND

CHARLES H. LAND was born at Simcoe, Ontario, January 11th, 1847, and died at Detroit, Mich., August 2, 1922. His parents were John Scott and Sarah Hayden Land. He was educated in the public schools of New York and Brooklyn. From 1864-66 he studied dentistry under J. B. Meacham of Brantford, Canada; and then went to Chicago where he entered the offices of Drs. M. B. Sherwood, L. P. Haskell, and W. W. Allport. In 1871 he went to Detroit, Mich., where he remained actively engaged in dental practice up to a few days of his death. He was married in 1875 to Evangeline Lodge, of Detroit.



DR. CHARLES H. LAND

Dr. Land was possessed of an unusually active and inventive mind. At an early date he was imbued with the possibilities of porcelain for dental restorations. His first experiences of sitting up all night to fire teeth in a coal furnace made him experiment along this line. In the early eighties he invented a very efficient gas furnace and along with it a gold and porcelain inlay and jacket crown system of dentistry. He was continually experimenting along these lines and developed many devices to aid porcelain work. Among some of these are the Platinum backed Porcelain Jacket Crown, the All-Porcelain Jacket Crown, the tube matrix, Mouldable Porcelain, a means to chemically unite oxyphosphate and silicate cements to porcelain. He also developed oil burners such as those now used in the dental factories. In 1912 he developed a high temperature furnace of the surface combustion type with the view of improving the porcelain crown. He considered this field offered wonderful opportunities for research work and was

working in it up to the end. His enamel replacement crowns in which the platinum matrix was eliminated proved very successful in his own practice.

Dr. Land often warned young men that patents very seldom resulted in financial success. For unless a dentist is gifted with a good business head and plenty of financial backing, he would not get far with the keen legal talent pitted against him. He further stated that he took out patents to establish discovery and at least have the right to use it. He took the warmest interest in those who tried to benefit Dental Art and was always willing to lend his aid.

Dr. Land had a strong bent for nature and would often search the wood lots around the city for specimens of plant and animal life.

Equal Rights

Women now demand that equal rights with men be incorporated in the Constitution. What does a woman have to wear during the oppressive dog days?

One low-necked sleeveless mosquito netting gown.

One pair silk stockings.

One pair slippers.

That's all.

What does a man wear during the said dog days?

One coat.

One vest.

One pair trousers.

One shirt with starched collar.

One pair shoes.

One union suit.

One hat.

One pair suspenders.

One belt.

One necktie.

If he takes his coat off in a hot restaurant he is thrown out. If he takes his tight collar off, he's a rube. If he wore his trousers slit up to the knee he would be sent to the insane asylum.

Equal rights? Huh!—Exchange

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

Last month's Bulletin stated that Vitamin A, which is soluble in fats, was considered anti-richtic. English authorities state that its absence from the foods of expectant mothers either permits or causes rickets in their children. The foods of the lower-middle and lower classes in England are so deficient in this necessary element that comparatively few families "carry on" into the third generation. Meat, bread, potatoes, legumes (beans, peas, etc.) make up a large part of the daily diet of these people.

McCollum also credits this element, vitamin A, fat-soluble, with having distinctly defensive influence upon the eyes, and refers to it as "anti-ophthalmic." His proof is *per contra*. Its absence from foods causes or permits the development of ophthalmic eye-diseases. Here we have two examples—one of parental influence, the other of influence upon the young, growing generation.

Notice the tables. See how little of this element is contained in the so-called high-grade diet served upon the average American table of the "better classes"—By "better" we mean only those who are able to buy and pay for anything they want. As a rule, the higher the cost of foods the poorer they are.

Meats contain very little of any of the Vitamins, and that little must be destroyed by the necessarily high cooking-temps, 350 to 450°F.

Vitamin A is destroyed or driven off at about 240°. Vitamin B, anti-neuritic (its absence causing nervous degeneracy of many kinds and degrees), at about 220. Foods containing these two of the necessary elements may be cooked at or below 212° the boiling point of water at sea-level.

Remember, it is temperature that cooks foods, not boiling. Water may be caused to boil at room temperature, but would cook nothing. Low heat, below boiling but near it, say 210°, will cook perfectly, but requires more time.

A plentiful supply of A and B may be had from cooked foods of the classes shown to contain it. But C, the anti-scorbutic element, must be obtained from raw foods. (See tables.) This element ceases to exist at about 120°.

This is the element in which dentists should be very greatly interested, since its absence is the permissive or passive cause of all scorbutic mouth troubles—and it is

not stretching the truth beyond recognition should we group together scurvy, gingivitis, pyorrhea alveolaris of all varieties, and all other diseases of the soft tissues of the mouth. An instance:

Natural milk carries good supply of C, yet if pasteurized milk alone is fed to babies, they quickly develop infantile scurvy. Now pasteurization means heating to 145°F, and holding that heat for 30 minutes. This makes clear the point.

To counteract this scorbutic tendency, prescribe two or three teaspoonfuls of orange, apple, pineapple, peach, berry, lemon, lime, grape or tomato juice to be fed to nursing children two or three times every day. Juice only. No child under 3 years old ever should be fed the solid parts of any fruits. Some writers say not under four years.

Of all the crimes committed for profit the rottenest is the adulteration of foods. For instance:

Skim-milk, thickened with cocoanut oil, to replace the butterfat of which it has been robbed, is widely sold in condensed form, according to reports. This oil lacks the vitamins and most other elements that the original cream possessed and results obtained from feeding it to growing children and babies are disastrous.

George Huston Bell, M.D., F.A.C.S., N. Y. Eye and Ear Infirmary, ophthalmologist U. S. P. H. hospital, N. Y. Polyclinic, writing in the *Journal of Oralogy*, says that food intoxication is the cause of oral and dental troubles in nine cases out of ten. Read this: "If abscessed teeth produce arthritis, heart disease, iritis, eye troubles, arteriosclerosis and insanity—then what produces abscessed teeth? It is the never-ending fermentation of foods in the gastrointestinal tract, the result of wrong food combinations. Correct diet is merely common-sense applied to living. The day is at hand when the progressive dentist must take up with his patients the questions of diet. There is invariably a state of acidosis as a foundation upon which infections are grafted.

In consultation with your patients say to them as plainly and as emphatically as you know how, that they would not require your services if they ate properly and the right kinds of food; and tell them that the furthest-back cause of mouth and tooth-troubles is in their abuse of their own digestive powers. "Make them understand what acidosis is.



The First & Final Selection

—no sending for “several sets”—
hoping that one of them may “do”

WHEN a dentist asks his dental depot to send him “a few sets for selection,” he doesn’t realize what his request involves. He doesn’t realize the cost to his depot, the inconvenience to other dentists and the loss to himself, or he would choose a more efficient method of selection.

Most orders for a selection call for three to six sets of teeth of approximately the same size and shade. A few such requests leave the dealer's stock short of those moulds and shades, and other dentists are unable to secure the teeth they need.

Trubyte

Made Real Selection Possible

The use of a Trubyte Mould Guide and Selection Rim will enable you to select teeth that harmonize with your patient's face form and permits you to try the six anterior teeth, arranged on the Selection Rim under the patient's lip, so that both you and your patient can see just how they will appear when set up.

The result is that your first selection is usually final, and you have saved time and inconvenience for all concerned.

Your dental depot is willing and anxious to render you a valuable service, but when you think of it there is an enormous amount of lost energy and actual expense involved in the old custom of ordering several more sets of teeth than you expect to use, only to return them in the (sometime distant) future for credit.

Mould Guides for Trubyte Teeth and our other products put the dealer's stock at your service.

RESTORATIONS  THAT RESTORE

Your Dealer or Direct

The DENTISTS' SUPPLY COMPANY

220 West 42nd Street

New York City

Rub into them the fact that *unless* they get rid of acidosis, toxemia is sure to follow, and that toxemia will soon *get rid of them*."

Early symptoms of acidosis: Drowsiness, shortness of breath, rashes, itching toes, easily tired, catch cold easily, hair brittle and falling, ten o'clock litmus test, red, dizziness, mild eye-troubles, gums bleed easily, with more or less congestion and inflammation. Recurrent decay speedily following correctly performed restorative dentistry is an unfailing symptom of acidosis. So is that "puffed-up feeling" following meals, a general feeling of discomfort, laziness, indisposition to "git up and git."

DESTRUCTIVE DIET

Breakfast—Fruit juice, cooked fruit with sugar and cream, "breakfast foods," eggs and bacon, or chicken or steak with mushrooms, toast, rolls or muffins, coffee with cream and sugar.

Luncheon—Thick soups, meat, peas, beans, lentils, mashed potatoes, bread and butter, rice or bread pudding.

Dinner—Soup, meat, potatoes, macaroni and cheese, fresh vegetables, salad with French dressing, big sweet dessert, coffee, with cream and sugar.

DEFENSIVE DIET

Breakfast—On arising, juice of one or two oranges; if inclined to obesity, add juice of half of a lemon. Half to one hour later, any cooked fruit, except plums, prunes or cranberries, a cereal with cream (very little if any sugar), black coffee without sugar. (The best cereal food is either whole wheat or whole rye, cooked slowly until it pops open. Sufficient for two days may be cooked at one time in summer, and a larger supply in winter.)

Luncheon—Milk alone, or with wheat-
worth (entire wheat) crackers. Or two or three apples. Or, for eighty per cent. of indoor workers, NOTHING.

Dinner—Clear soup, one *meat, two or three fresh vegetables, cabbage salad, with oil and lemon juice dressing; fruit dessert.

(*Better omit the meat unless you really need proteins.)

From Bulletins of the Defensive Diet League of America. If interested write for further information.—G. E. H.

Investigation by McCollum, Hess, Moore and Calvin into the extravagant claims of the makers of nostrums supposed to carry vitamins and alkalins have conclusively demonstrated not only their worthlessness, but their positively injurious nature as well. One of this group of investigators concluded his report, printed in the Journal A. M. A., by saying: "Vitamins should be obtained from the dairy, the grocery and the market, and not from the drug-store."

Eddy's Vitamin Tables

In these tables the letter x represents the minimum vitamin content; xx a larger proportion; xxx still larger; xxxx the maximum; o none; ? possibly very little; (blank)—not thoroughly investigated.

SEEDS

	A	B	C
Beans kidney	..	xxx	..
Beans navy	..	xxx	..
Beans soy	x	xxx	0
Cotton seed	xx	xxx	..
Flax seed	xx	xxx	..
Hemp seed	xx	xxx	..
Millet seed	xx	xxx	..
Peanuts	x	xx	..
Peas dry	x?	xx	0
Sun Flr. Seed	x	..	..

CEREALS

	A	B	C
Barley	x	xxx	?
Bread, White	..	x?	..
Whl. Wht. Brd.	x	xxx	?
Corn, Yellow	x	xxx	?
Oats	x	xxx	0
Polished rice	0	0	0
Rye	x	xxx	0
Corn embryo	..	xxx	..
Malt Extract	0	0	0
Wheat Bran	0	x	0
Endosperm	0	0	0
Kernel	x	xxx	0

FRUITS

	A	B	C
Apples	..	xx	xx
Bananas	?	x	xx
Grape Fruit	..	xxx	xxx
Grape Juice	?	x	x
Lemons	..	xxx	xxxx
Oranges	..	xxx	xxxx
Pears	..	xx	xx
Raisins	..	x	x
Tomatoes	xx	xxx	xxxx
Limes	..	xx	xx

DAIRY PRODUCTS

	A	B	C
Skim milk powder...	x	xxx	x?
Cheese	xx	x	?
Whole-milk powder ..	xxx	xxx	x?
Condensed milk	xx	x	0
Butter	xxxx	0	0
Cream	xxx	x	?
Whey	x	xxx	x
Whole milk	xxx	xxx	xx

MEATS

	A	B	C
Beef hearts	x	x	?
Brains	xx	xxx	x?
Cod fish	x	x	?
Herring	xx	xx	?
Horse meat	x	x	?
Kidney	xx	xx	?
Lean Muscle	0	0	x?
Liver	x	x	x?
Pancreas	0	xxx	?
Pig hearts	x	x	x?
Thymus	0	0	0?
Fish roe	x	xx	?

VEGETABLES

	A	B	C
Cabbage	xxx	xxx	xxxx
Carrots	xxx	xxx	xx
Cauliflower	xx	xxx	xx
Celery	?	xxx	?
Lettuce	xx	xx	xxxx
Rutabagas	..	xxx	..
Onions	?	xxx	xxx
Parsnips	xx	xxx	..
Peas	x	xx	xxx
Potato, Swt	0	xxx	xx
Potatoes	0	xx	?
Spinach	xxx	xxx	xxx

FATS AND OILS

	A	B	C
Beef fat	x	0	0
Butter	xxxx	0	0
Cocoanut oil	0	0	0
Codliver oil	xxxx	0	0
Corn oil	0	0	0
Cotton seed oil	0?	0	0
Egg yolk fat	xxxx	0	0
Fish oils	xx	0	0
Lard	0?	0	0
Oleo animal	x	0	0
Oleo vegetable	0	0	0
Pork fat	0?	0	0
Tallow	0	0	0
Veg. oils	0?	0	0

MISCELLANEOUS ITEMS

	A	B	C
Alfalfa	xxx	xxx	?
Clover	xxx	xxxx	?
Honey	..	xx	0
Malt Extract	0	0	0
Timothy	xx	xxx	..
Yeast brewers	0	xxxx	0
Yeast cake	0	xx	0
Yeast extracts	0	xxx	0

IPANA

TOOTH PASTE

Heals Bleeding Gums

—so your brother dentists have told us—

Is it not your duty to know all about dentifrices?

Should you not recommend the one that meets all your requirements?

Ipana Tooth Paste cleans and polishes the teeth thoroughly and without harm—corrects soft and spongy gums—Heals Bleeding Gums—and has a flavor that is smooth, snappy and delightful.

*You and your patients
should know and use
IPANA.*

A Professional sample awaits your card.

BRISTOL-MYERS CO.

48 Rector Street

New York City

Makers of SAL HEPATICA



Recent Dental Elections

Milford, Del., July 7.—The American Dental Trade Association has elected Dr. G. Layton Grier, of Milford, Del., president; Alex. R. Keltie, Boston, vice president; Chas. O. Rother, Buffalo, treasurer, and Sumner Reynolds, Boston, secretary.

Montana State—G. J. Packard, Livingston, president; J. G. Kohl, Stevensville, secretary-treasurer; J. E. Buehler, Great Falls, superintendent of clinics. The 1923 meeting will be held in Missoula.

Columbus, Ohio.—The Columbus Dental Society has elected these officers: H. S. Shumway, president; E. N. Hoopman, vice president; Dr. N. A. Ross, treasurer; C. H. Hebble, secretary; C. W. Strosnider, corresponding secretary.

Utah State.—R. L. Watson, president; T. Fred Hardy, first vice president; C. H. Bryan, second vice president, and Ernest W. Browning, secretary and treasurer. The second vice president is of Brigham City. The other officers are of Salt Lake.

R. & R. MODEL PLASTER

LOW EXPANSION—NO CONTRACTION

So made that it yields the greatest service as a model plaster.

Initial Set—6 to 9 minutes

Final Set—12 to 15 minutes

It is very fine and snow-white, and does not deteriorate with age. Very high in tensile strength. Models show less distortion and consequently yield a better fit. A test will prove its superiority.

Price per can, about 12 pounds, F. O. B. Toledo, \$2.00



R. & R. IMPRESSION PLASTER

A pure gypsum product, snow-white and extremely fine.

Initial Set—2 to 3 minutes

Final Set—5 to 8 minutes

R. & R. Impression Plaster is made by our special process and is in every way an ideal impression material. It reproduces the finest lines and most delicate contours of mouth tissues, and breaks with a sharp, clear fracture. Contraction: None. Expansion after setting 24 hours: .14 %

Price per can, about 12 pounds, F. O. B. Toledo, \$2.00



The Ransom & Randolph Company
TOLEDO, O. U. S. A.
CLEVELAND AKRON DETROIT FLINT GRAND RAPIDS
COLUMBUS INDIANAPOLIS

PULP-LIFE

*Plus
a knowing dentist
saves pulps*

The saving of pulps is a worthy endeavor. It used to demand much professional patience.

Today, Pulp-Life added to Nature and professional ability brings prompt and saving results.

Full directions accompany each package. If you prefer to go over the directions first, we will gladly send a copy.

DeSanno & Hoskins, Inc.
PHILADELPHIA

ALSO MANUFACTURERS OF DENTAL
HYPODERMIC EQUIPMENT, LIGHT-
NING DISCS AND STRIPS, NUK-
LORENE AND SPECIALTIES.

Washington State.—S. A. Fulton, of Walla, Walla, president, George O. Clark of Aberdeen, vice president, and William B. Fowler of Seattle, secretary-treasurer. New members of the executive committee are Dr. Aubry L. Martin and Dr. A. H. Meadowcroft, of Seattle and Dr. J. A. Major of Yakima.

Licensed to Practice

Ninety-one of the 110 graduates O. S. U. passed the State board and have been licensed. The board has been reorganized as follows:

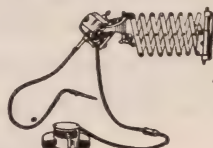
Dr. F. E. McKim, jr., Marietta, president, succeeding Dr. J. F. McDonagh, Cleveland, Dr. Ray R. Smith, Columbus, was re-elected secretary.

Fifty candidates were licensed by the New Jersey board June 25-29.

Sixty-four of a class of 103 graduates were licensed by the California state Board June 24.

The entire class of Iowa university, 39 in number, passed the state board July 15, and were licensed to practice.

**ALL-CORD
TYPES
\$125**



**CABLE
TYPES
\$120**

**DIRECT OR FROM YOUR DEALER
CONVENIENT TERMS
CATALOGUE ON REQUEST**

**SOLD BY
AMERICAN DENTAL MFG. CO.
80 BOYLSTON STREET
BOSTON MASS. U. S. A.**

DeSanno & Hoskins, Inc.
PHILADELPHIA

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Sal Hepatica

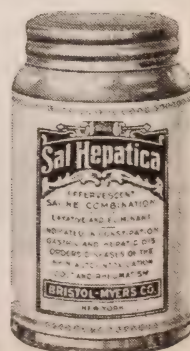
Materially Aids
Local Treatment

IN

PYORRHEA

Samples on Request

Bristol-Myers Co.
NEW YORK



Deaths

At Milwaukee, Wis., July 11, Dr. Peter Mulholland, aged 47.

At Chicago, July 28, Dr. Philip H. Goldstein, aged 30. Thrombosis under gas anesthesia.

At Patchogue, N. Y., August 1, Dr. James H. McKnight, aged 29. Tuberculosis

At Sioux City, Ia., August 4, Dr. H. S. Evers, aged 45, automobile accident.

At Selmer, Tenn., August 2, Dr. G. W. North, aged 40, pistol shot in street duel.

At Superior, Wis., August 4, Dr. Franz J. Krembs, of Stevens Point, aged 36. Apoplexy.

At Oak Harbor, Ohio, August 7, Dr. A. L. Hyzer, of Clyde, during a game of tennis, aged 45. Acute indigestion.

At Toledo, Ohio, August 5, Dr. William D. Hand, aged 36.

At Indianapolis, Ind., August 8, Dr. Milton F. Ault, ex-dean, Indiana College. Cerebral hemorrhage.

W. A. Wright undertaker and furniture dealer of Rushsylvania, Ohio, died very suddenly August the 7th. He had not been feeling well for several months but was still able to be about and engage in light work.

Only two or three moments before he died

he had been discussing matters concerning the business with his son-in-law, and remarked that he was feeling good. The day before he had celebrated his 71st birthday. Mr. Wright had been engaged in business in Rushsylvania for 52 years.

Is survived by two sons, Carl S. Wright, manager of the Indianapolis house of The Ransom & Randolph Co., Dr. I. W. Wright, St. Marys, Ohio, Mrs. L. C. Carr, Rushsylvania, and Mrs. A. T. Hall, Bellefontaine, Ohio. Funeral services were held Thursday afternoon.

The recent death of Adrian Spear Rutherford, 2464 Grand Avenue, New York City, who was well known to the dental profession throughout the United States, was commented on by "The Trustgage", a publication issued by the employees of the United States Mortgage & Trust Company, executor under his will. The late Mr. Rutherford had served the profession since 1890 as a refiner of gold and silver, and as a manufacturer of "999" alloys and mercury bearing his name. The business has been discontinued.

The article appearing in "The Trustgage" was as follows:

An unusual provision is made in connection with the will of the late Adrian Spear Rutherford, an assayer of metals, who

You get paid for the results you get

—not merely for radiographs. Make your results good diagnostic pictures every time.

Proper Penetration, Proper Angles and Distance, Proper Time of Exposure.

Every perfect radiograph must be based on these features.

They must be controlled otherwise you are guessing.

The design and construction of the Adams with the use of the Adams film holder controls every one of these factors.

You won't need a special room—the Adams won't be in the way—it will always be available for instant use. Use it with your chair, a stool, or with the patient standing. It occupies only a 20-inch square of floor space.

Every Exposure Counts.

ADAMS X-RAY COMPANY

1020 Maple Street

Detroit, Michigan

named this Company as his executor. The will is now in process of probate.

Meanwhile the Company has been requested by the family, and is directed by a memorandum left by Mr. Rutherford, to take such steps as are necessary to recover from his laboratory the gold, silver and platinum which may have accumulated during the fifteen years of his occupancy. Presumably a substantial amount of the metals named will be found on the floors and work bench of the laboratory.

Elmer S. Grant, New Albany, Ind., colored, is the youngest dentist ever graduated by the Indiana Dental College, having passed his twentieth birthday, January 5, 1922. He was graduated from the New Albany high school at 16.

Modern Dentistry

Altogether, it is a wonderful luxury to be sick these days; the many bills that come in afterwards prove it.

And your erstwhile family dentist—where, oh where, does he "come in"?

Tooth is to be extracted? Exodontist.

Teeth regulated? Orthodontist.

Pyorrhea? Periodontist.

Teeth need cleaning? Dental Hygienist.

Root canals to be filled? Pathodontist.

Baby's tooth hurts? Pedodontist.
Plate to be made? Prosthodontist.
Nothing the matter? Impossible! Radiodontist.

Tooth to be filled? Oh what luck! Home at last!

And while that is the dentistry of today, it is going to be worse yet, or possibly better, according to how you view it.—C. Edmund Kells, in the Dental Cosmos.

Rochester, N. Y., July 24.—Ground was broken in Rochester for the \$10,000,000 college of medicine and dentistry made possible by the gifts of Eastman and John D. Rockefeller. It will take five years to build and its site occupies 125 acres.

Classified Advertisements under this heading, \$2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more special rate on application.

FOR SALE—Complete equipment and practice of the late Dr. M. M. Powell of Ashley, Ohio. Ideal location. City population over 1000. Rich farming community within radius of 10 miles of the city. Equipment in very good condition and ready for use. Low rent. If interested address Mrs. Gertrude Powell, Ashley, Ohio.

FOR SALE—One complete American Safety Gas Appliance, one Castle Sterilizing Outfit, No. 1410D electric. These articles have been slightly used and are in good condition. For particulars address Dr. R. E. Ley., Dover, Ohio. 910-P

LEARN MECHANICAL DENTISTRY



EARN \$35 to \$125 A WEEK—A SUCCESSFUL CAREER ASSURED

Investigate the opportunity this pleasant, dignified profession offers. Age or lack of experience no barrier! We teach by actual practice. Instruction under the direction of Prof. Geo. A. Bodee.

Established Over 30 Years—Nation-Wide in Recognition

Owing to our recognized ability and long experience in giving training of the most practical kind, our graduates are in great demand. Day or evening courses—three to nine months. Easy payments—no charge for equipment. Postgraduate course for Dentists or practicing Dental Mechanics. Our Bureau of Employment furnishes competent Mechanical Dentists without charge.

Write Today for 36 page Illustrated Catalog, Free. It gives complete details. Address your inquiry to Dept. 10-G

BODEE DENTAL INSTITUTE

New York, 136 W. 52nd St.—Phila., 15th & Walnut Sts.
Buffalo, 1226 Main St.—Brooklyn, 15 Flatbush Ave.

Revised Maxims

An ounce of attention is worth a pound of overhaul.

An oiling a day keeps the repair man away.

Look before you back.

Spare the oil and spoil the car.

A rolling car gathers no crowd.

A tool in the kit is worth thousands in the garage.

Service is as service does.

Fools rush in where experts fear to ride.

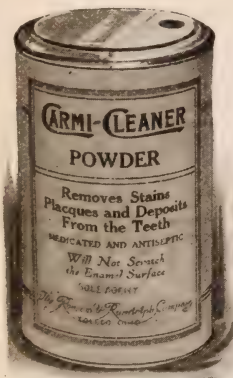
A little knowledge of electrical systems is a dangerous thing.

An ounce of instruction may save a pound of repair.

A skid to the wise is sufficient.

CARMI CLEANING AND POLISHING POWDERS

Medicated and Antiseptic



FOR CLEANING TEETH

A medicated antiseptic Cleaning Powder, in successful use for many years. Quickly removes infectious matter and all stains, leaving a smooth, unabraded surface, ready for polishing.

Small Size	-	-	-	\$.65
Large Size (7 oz.)	-	-	-	1.25
3 Pound Can	-	-	-	6.00

CARMI LUSTRO POLISHING POWDER

A medicated antiseptic, non-abrasive Polishing Powder, the first material ever offered for restoring the brilliancy to tooth enamel, no matter how lost.

POLISHES WITHOUT WEARING

Works by friction, not by abrasion. Restores highest brilliancy without injury to teeth.

Small Size	-	-	-	-	-	-	-	\$.65
Large Size	-	-	-	-	-	-	-	1.25

An Unequaled Polishing Powder

Your dealer can supply you with CARMI Products

The Ransom & Randolph Company
 TOLEDO, O. U. S. A.
 CLEVELAND ARRON DETROIT FLINT INDIANAPOLIS GRAND RAPIDS



L. G. Noel, D.D.S.
Vanderbilt University, Nashville, Tenn.

Officers of the
Tennessee State Dental Association
1867



Upper Center
J. P. WILSON

Center
W. H. MORGAN

Lower Center
W. H. WEBBER

S. J. COBB

First Row (left to right)

T. E. BEECH

M. McCARTY

NAME NOT OBTAINABLE

Second Row (left to right)

J. C. ROSS

ROBERT RUSSELL

Third Row (left to right)

WM. T. ARRINGTON

H. M. ACREE

Fourth Row (left to right)

JOHN ARRINGTON

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XLII

OCTOBER, 1922

No. 10

THE TENNESSEE STATE DENTAL ASSOCIATION*
ITS ORGANIZATION AND DEVELOPMENT
BY L. G. NOEL, D.D.S., NASHVILLE, TENN.

MY DEAR FRIENDS: It would be the height of egotism for me to stand in your presence today as one deserving to be thus honored.

I cannot flatter myself that anyone really thinks that my record as one of your fellows has been such as to merit this distinction, but I accept the honor as having been prompted by your love for one who, for so many years, has been your comrade and co-worker in our Association. This conception of your motive is far more pleasing to me, more in consonance with my feelings toward you, than to fancy myself deserving of this high honor because of my achievements.

This occasion marks a very important milestone in my life, and in my membership in this society.

Tonight I have reached the fiftieth anniversary of my connection with this body. Half a century may seem a very long time to some of the young men here assembled, but when I view it in retrospect, the time appears short, the fifty years seem to have passed with incredible swiftness. It has been like boating down a rapid stream, making many landings to take on new passengers and to part sadly with early companions and fellow-voyagers. The stream has in places been swift and rough; we have encountered dangerous rapids, but our vessel has been strengthened, its passengers have increased, the river is broader, calmer and deeper now, the prospect is more alluring and all is bright and hopeful. We have changed captains many times; but we have now a most efficient set of officers and a most devoted and courageous crew. Our boat is in fine fettle; the time is a very happy one, but we miss our old officers and fellows

*Read at the Banquet tendered Dr. Noel by the Tennessee State Association, Tuesday evening, May 9, 1922, the Fiftieth Anniversary of his membership, as a general response to toasts and addresses in his honor. Dr. C. J. Washington, toastmaster.

whom we have dropped by the way, and tonight I think it would be appropriate, while we pause at this landing, to pay our respects to some of these men.

When I entered the office of my preceptor, the late Dr. W. H. Morgan, of Nashville, I was only seventeen, and a very green country boy with the merest rudiments of an education; but meager as my preparation had been I was put to work under a "mechanical dentist" in Dr. Morgan's laboratory, and to occupy my leisure time I was assigned the study of osteology with a skeleton and a disarticulated cranium. I found the bony frame-work of man a very wonderful mechanism as I read all about it in "Gray's Descriptive Anatomy."

I had a private medical tutor, Dr. D. DuPre, who, by the assignment of tasks followed up by recitals, managed to lead me very gradually onward in my studies.

My preceptor, Dr. Morgan, was a very remarkable man and it is of him that I wish now to speak and not of myself.

He was brought up in Southern Kentucky and his early life had been spent at hard labor on his father's farm. His early education had been obtained under the greatest difficulties and in a very fragmentary, haphazard way at country schools, exactly as I afterwards had to get my own schooling. I do not know what gave Dr. Morgan the desire to study dentistry, but having decided to take it up as his life-work, he resolved to get into the profession properly equipped and through the best available school; therefore, he entered the Baltimore College of Dental Surgery in the second or third year of its existence.

No doubt it was his association with that noble corps of teachers that constituted the faculty of the Baltimore College of Dental Surgery, that so fired Dr. Morgan with zeal for the advancement of his profession.

Chapin A. Harris, at the head of the Baltimore Dental School, was himself so aglow with love for dentistry that he imparted his enthusiasm to every man who came under his influence.

Soon after his graduation Dr. Morgan settled in Nashville, and formed a partnership with Dr. Hamlin, who had long enjoyed a very choice and lucrative practice.

When I came to Dr. Morgan as a student, Dr. Hamlin had long before retired to his farm to recuperate his failing health, and to enjoy the pursuit of his dearest fad—bee culture.

Dr. Morgan was in the early days of my pupilage in the height of his usefulness and popularity; he had already, by his ability and skill in his calling, industry and thrift, amassed quite a fortune for his day and vocation.

He stood high in his city, enjoying the best society. He was a devoted Mason, having climbed to some of the highest honors in that

order. He was a very ardent and devoted Methodist, and a busy worker in that church; but none of these things ever hindered his work for the advancement of his chosen profession. Soon after leaving the Baltimore College he joined the American Dental Association and he seldom failed to attend its annual meetings. Dr Morgan was very genial in his disposition, a very entertaining talker, and therefore he made friends everywhere. He was a very forceful speaker, usually taking part in the discussions, generally maintaining his standpoint creditably. These qualities added to his striking personality, his extensive travel, and constant attendance at dental conventions, made him one of the most popular and extensively-known men in his profession throughout the United States.

In 1870 Dr. Morgan was president of the American Dental Association, which was brought to Nashville to do him honor in his own city.

When I entered Dr. Morgan's office in 1868 he had, with the aid of his friend Dr. Arrington, of Memphis, and a little group of professional friends from the chief towns and cities of Tennessee, succeeded in organizing our State Dental Association. The first movement to that end was on the part of Dr. Wm. T. Arrington, who called a meeting at his office in Memphis, record of which I find in his own writing in the minutes of our Association, as follows:

"At an informal meeting of the dentists of Memphis, held at the office of Dr. Wm. T. Arrington on the 24th of June, 1867, a circular letter was prepared and sent to the best men in the profession over the state, and into the nearby states, pointing out the need of organization and calling a meeting at the office of Dr. W. H. Morgan in Nashville, on July 26th, for the purpose of organizing a State Dental Association."

This meeting was accordingly assembled at the time and place above mentioned (July 26th, 1867), and the following men were present:

Dr. G. W. Acree, Memphis	Dr. S. J. Cobb, Nashville
Dr. Wm. T. Arrington, Memphis	Dr. J. P. Wilson, Nashville
Dr. J. B. Wasson, Memphis	Dr. J. A. Arrington, Jackson
Dr. W. R. Johnson, Columbia	Dr. H. M. Acree, Clarksville
Dr. T. E. Beech, Franklin	Dr. Alex Hartman, Murfreesboro
Dr. W. H. Morgan, Nashville	Dr. M. McCarty, Pulaski
Dr. J. C. Ross, Nashville	Dr. S. P. Cutler, Holly Springs, Miss.
Dr. Robert Russell, Nashville	Dr. J. T. Noel, Franklin, Ky.

Drs. Morgan and Arrington were good friends and exchanged many letters.

It is now left for us only to conjecture in whose brain the idea originated of organizing the dentists of the State into a Dental Association, but Drs. Morgan and Arrington were the prime movers, and the idea must have been entertained first by these two.

When I began the study of dentistry our Association was just one year old, the first meeting having been held in 1867. Dr. Morgan was doing a large practice. He was a social success; he could have had almost any office or honor he desired in the gift of the people of his state; but above everything else he preferred the advancement of his

profession. His extensive travel showed him that the profession in Tennessee was falling behind the general forward movement of the brethren of the North and East, and he could not endure that state of things. Above everything else he jealously placed the interests of his chosen profession; therefore he was very enthusiastic about the newly-formed Tennessee Dental Association.

His very dear friend, his chief helper, counsellor and co-worker in this accomplishment, was the late Dr. Wm. T. Arrington, of Memphis; and having effected the organization of the Tennessee Dental Association these two enthusiasts kept up a busy correspondence with the leading dentists of the South with a view to the organization of a Southern Dental Association. It must have been in the year 1869, I think it was in the summer of that year, that those two friends called a meeting at Dr. Morgan's office in Nashville with the purpose in view of founding a Southern Dental Association. Drs. Morgan and Arrington were members of the Mississippi Valley Dental Association, which usually held its annual meetings in one of the flourishing cities of that Valley, but generally rather high up North, and I think it was their desire to spread the benefits of associated effort to their dear South, which they most ardently loved, that led them to join efforts and work so hard to organize the Southern Dental Association.

The charming and genial Dr. Arrington was present at that preliminary meeting, taking a leading part, and it was on that occasion that I first met him. He was a man among men, once seen never to be forgotten. Tall, graceful, handsome, a forceful and beautiful speaker, he was well calculated to make his mark in any assembly. With his winning smile and his suavity of manner he usually carried his points. My recollection of those who attended that preliminary meeting may be a little hazy after all these years, (I have no record to aid my memory), but besides these two prime movers, Drs. Morgan and Arrington, I recall Dr. W. G. Redman, of Louisville, Drs. Lowrance and Hape, of Georgia, Drs. J. C. Ross, S. J. Cobb. Robert Russell and Dr. Wilson, of Nashville; Drs. L. C. Chisholm and E. S. Chisholm, of North Alabama; Dr. John Arrington, of Jackson; Dr. L. Augspath, of Arkansas; Dr. Beech, of Franklin, and Dr. Martin McCarty, of Pulaski. No doubt I have omitted several who were present and took part in this meeting, but there were only a few present from Tennessee and the nearby Southern States, and the chief accomplishment at that time was the preparation of a circular setting forth the need of such organization and calling the first meeting at Atlanta, Ga.

When that circular letter was printed the work of addressing and mailing was performed by Dr. Wilson and myself. Dr. Wilson was my fellow-student under Dr. Morgan. He was employed by my preceptor in the capacity of "mechanical dentist" and general assis-

tant. He was a Pennsylvanian by birth, having been employed in a Cincinnati office before coming to Dr. Morgan.

A year after the time of which I speak he died of hemorrhage from the lungs caused by an effort which we together made to move a heavy dental chair. He lived some time after the first hemorrhage, a week or ten days, but succumbed at last after repeated hemorrhages. He was a fine young man, very promising and beloved by all who knew him. His photograph, taken at the time, heads the group of the men who organized the Tennessee Dental Association. One of the above-mentioned group who had a large practice in Nashville at the time of our organization, and who, from the beginning, took part in our Society, was Dr. Robert Russell. He was from the State of Maine and had been a traveling dentist.

Dr. Arrington told me the first time he ever saw Dr. Russell was on a steamboat coming down from St. Louis to Memphis. Dr. Russell was accompanied by his wife and a highly-trained dog. The latter attracted much attention. I seem to recall that Dr. Arrington said the trio gave some kind of a show at important stopping places. It was quite common in the early settlement of the great Mississippi Valley for the most skillful dental surgeons to travel from city to city, stopping sometimes in small towns and at great plantations. Drs. Badger and Van Camp were such itinerants, but both were men of great dignity, who would have recoiled at any suggestion of stirring up business with a show, or any like method of advertising.

While Dr. Russell may have been a little spectacular in his early days, it was to be attributed to his training and environment, rather than to anything wrong in his heart, for I became well acquainted with him, and saw many instances of his very great kindness of heart. He was ever ready to befriend and aid the struggling student, especially if his quick wit and good judgment recognized ability in a boy. Dr. Russell was genial, quaintly humorous, and made many friends, was a highly-skilled prosthetic dentist, and conducted a large practice. After some busy years in Nashville he went to Paris, France, to practice, but not meeting the success he expected, came back to our Capitol City and resumed his business as if having been away on a little pleasure trip.

He organized the Dental Department of the University of Tennessee.

Dr. Morgan, soon after the founding and location of Vanderbilt University at Nashville, was importuned by his long time friend, Bishop H. N. McTyeire, to organize a School of Dentistry under the auspices of Vanderbilt University.

It will be recalled that Bishop McTyeire, of the Southern Methodist Church, was the founder of Vanderbilt University, and the organizer of its many schools. Dr. Morgan was, at first, very

reluctant to undertake the work and the responsibility. He told the Bishop that he thought Nashville too small a city for the support of a successful dental school.

Months passed with no move on Dr. Morgan's part toward the organization of a dental school, and the good Bishop was beginning to think he must look elsewhere for a leader.

Thus matters stood in the Spring of 1878 when the Bishop, knowing that I was to preside at the annual meeting of our State Dental Association, requested me to appeal to our Society, in my annual address, to aid him in founding a dental school.

He asked me to extend an invitation, from the president (himself) of the University, to our Association to visit the University during our meeting, promising to see that they were cordially welcomed and given an opportunity to see the full plan and scope of the great seat of education. He wished me to assure our Association of his purpose to found a school of dentistry equal to any in the United States, and to implore the aid and sympathy of our Association to that end.

Accordingly, the Bishop's invitation was extended, the Society accepting, setting an afternoon for the visit which was much enjoyed by all. Very soon after this Dr. Morgan was ready to take up the work of organization, and it moved along without further hesitation to the opening of the school the following year, 1879. Thus you will see the part our State Dental Association took in founding the School of Dentistry at Vanderbilt; therefore the Vanderbilt School of Dentistry, from its inception, has enjoyed a very close relationship to our State Society, and I am sure its faculty is proud of this and hopes to see it strengthen as the years pass.

It has been my lot in the brief period of a life to see these dental associations founded, grow and flourish, and in my own city to see three dental schools established; for after the opening of the Meharry School of Medicine for Colored men, a Department of Dentistry was attached, which has grown to surprising proportions and has this term an enrollment of 250 students. When failing health led to the retirement of Dr. Morgan from the Deanship of the Vanderbilt School of Dentistry, Dr. D. R. Stubblefield succeeded him, and for a number of years filled that difficult position, when failing health compelled his retirement also, and Dr. Henry W. Morgan, son of Dr. W. H. Morgan, succeeded to the Deanship. These three men may be said to have literally sacrificed their lives to the performance of the onerous duties of this office.

At present we have in our popular and beloved Dr. Bogle (may he live long and prosper) a man who laughs at difficulties and who puts them behind him like a strong swimmer buffeting the waves.

Dr. Henry Morgan was a true son of his father, resembling him much in character and attainments. He so loved and admired his

father that it was his earnest desire to do things as he thought his father would have done them, and yet he was himself a man of very strong character and originality.

Dr. Henry Morgan was a member of this Association from the date of his graduation, and his work in our midst needs no praise from me. Every duty that fell to his lot was faithfully and well performed, and his finished work speaks for itself. Like his illustrious father, Dr. Henry Morgan was widely and favorably known all over the United States, and was a busy worker in all our National Dental organizations. He was at one time President of the National Association of College Faculties, and was, during his life as a teacher, a most industrious student of pedagogic work in dental schools seeking ever the advancement and betterment of our profession.

Dr. Henry Morgan contributed many papers to our literature and several on his favorite theme, "Dental Education."

It is very comforting to know that these remarkable Morgans, who have done so much for our profession, and for the education of our students, have left in our midst a worthy successor in the person of our Dr. Walter Morgan, who is following in the footsteps of his illustrious progenitors, and is now a very live wire in our organization, who promises to do credit to his name and much good work in his calling. May he live long and prosper. We also rejoice that Dr. Arrington has left in our midst a worthy successor in our beloved co-worker, Dr. Wm. T. Arrington, Jr. May he enjoy long life and much happiness.

One of the men who participated in the organization of our Association, and who was ever faithful in attendance and in the discharge of duty, a man whose removal by death has been so recent that we almost instinctively expect to see him in his accustomed place when our meeting is called to order, and whose absence is keenly felt by us all, was Dr. P. D. Houston, of Lewisburg. Dr. Houston was for more than fifty years one of our most faithful members, beloved by all his fellows, and ever standing for the highest aims and ideals in his profession.

Dr. Houston reared a number of sons, all of whom have attained notable success in life. One a busy and successful dentist in far away Brazil, one the president of one of Nashville's largest banks, and one, I am happy to say, now a member of our Association, Dr. David Houston, a worthy successor of the honored deceased father.

There are several remarkable men who have been active and honored members of this body, whom I recall to you on this occasion, dwelling fondly upon their excellencies of character; but time and space will admit only of the briefest mention. Some of these men have so engraven their records upon our memories that the mere utterance of the name is sufficient to recall the man whose

life it would be futile to attempt to review in so short a space.

These men may be with us in the spirit on this occasion, so let us call their names with reverence. Omitting those already mentioned above, I desire to recall the following beloved deceased brethren:

J. C. Ross	S. J. Cobb
R. R. Freeman	H. E. Beach
A. F. Claywell	J. L. Mewborn
S. B. Cook	J. Y. Crawford
Gordon White	D. R. Stubblefield
J. P. Gray	John Cottrell
Dr. Shotwell	Drs. Lee and Billmeyer, of Chattanooga.

In the early days of our Society we had several men from adjoining states who availed themselves of the facilities offered by our body for advancement, and who most faithfully contributed their share to the annual harvest of special knowledge.

The two Chisholms, of North Alabama, were very efficient and active members, coming in from year to year with instructive papers and clinics, and always bringing with these that most valuable of all contributions, brotherly love and fellowship—something too elusive to be spread upon the minutes—but the very breath of life to a social body. These men had rare and highly-trained skill as dentists, the elder brother, L. C. Chisholm, being one of the best gold-plate workers in all the South, and the younger brother, E. S. Chisholm, was peculiarly skillful as an operator; a past-master in the art of filling teeth with gold foil. Besides he was an accomplished musician. Dr. Louis Augspath, of Arkansas, was in the early period an attendant at our meetings, attracted by, and following his magnetic friend, Dr. Wm. T. Arrington.

One of our almost annual visitors in those early years was Dr. Johnathan Taft, of Cincinnati, an uncle of the late president. He was always inspiring, instructive, forceful and convincing.

Dr. Taft and Dr. W. H. Morgan were great friends, and the former was usually Dr. Morgan's guest when the meeting was being held in Nashville. On these visits I profited by the opportunity to be in Dr. Taft's company. He was fond of the society of young men and always glad to place his vast store of knowledge at their disposal.

Being, for a time, secretary of our Association, Dr. Taft asked me to prepare brief reports of our proceedings for the *Ohio Dental Journal* (now THE DENTAL SUMMARY), of which he was editor. This gave me plenty of work, but I was well paid for my labor when Dr. Taft would, from day to day, read my minutes and make suggestions as to style, clarity, brevity and many other things that I very much needed to be taught.

One of the most remarkable early members of our Association was Dr. S. P. Cutler, of Holly Springs, Miss. I do not know anything of Dr. Cutler's early life. I do not know the state of his nativity and rearing, but he was living in Holly Springs when he held membership in this Association and I think he was practicing dentistry. He was quite aged, and his appearance was most venerable and distinguished. He was a microscopist and histologist of great ability, and usually brought his microscope to our meetings with something new and good to show. At that time, during the seventies and eighties, there was much interest felt in microscopy and histology. Koch and others had introduced methods of staining that greatly advanced the science of bacteriology; the microscope was being much improved; some pathogenic germs had been discovered, and the whole scientific world was on the alert for new developments. Methods of preparing, staining and mounting specimens were being changed and improved. Dr. Cutler was deep in all this work, and we hung upon his words, expecting at any time the announcement of some startling discovery. I well recall the interest he expressed at one of our meetings in the efforts of Brown-Sequard to restore youthful vigor to the aged. In the light of recent researches upon the function of the ductless glands, and the recrudescence of the same wild hope of prolonging life and maintaining a longer hold upon youth, researches that are being pressed vigorously at the present day, we learn that science is not dismayed by failure, but seeks entrance into any realm that may be penetrated by the rays of the human imagination. If we may return to the theories of Ponce De Leon and Brown-Sequard, is it wonderful that a man of Edison's standing should go back to the beginning of chemistry to take up the theory of the alchemists about the conversion of the baser metals into gold? The experiments of Steinmetz, of Schenectady, N. Y., in producing "artificial lighting" with a superpowerful electric discharge; those of Drs. Wendt and Irion, of the University of Chicago, who have been experimenting with these electric discharges upon metals, have opened up wonderful possibilities. Tungsten is converted into helium gas when subjected to a temperature of 50 to 60 thousand degrees F. These experimenters have proved that the nature of metals *can* be changed, and it is probable that some of these are in a constant state of gaseous fluidity in the stars and sun.

The modern scientists stand ready to accept the most astounding revelations, and they are coming fast.

Whether we shall wrest from nature the secret of the origin of life, we may not know until we shall have passed beyond life's bounds, and then the things we now so much desire to know may have for us very little interest when compared to the possibilities that there may open up to us. When about to go down with the Titanic, Chas. Frohman is reported to have declared death to be

the greatest adventure that life had ever offered to him, and with that cheerful acceptance of his fate, he gave his place in the life-boat to the women and children. Soon we shall have to face the same inevitable, if less sudden ordeal, and I hope we may meet it with the same cheerful and trusting resignation.

(The reading of this paper was followed by prolonged applause, and adjournment was succeeded by an impromptu "reception," during which Dr. Noel was assured by many warm handclaps of the love and very high esteem in which he is held, emphasizing the earlier presentation during the evening by Dr. Boyd Bogle, of a beautiful loving cup, accompanied by a handsome sheaf of roses for Mrs. Noel, who sat at Dr. Noel's side, plainly evincing her happiness in the expressions of friendship and honor heaped upon the Doctor.)

We are running a double frontispiece this month, one a portrait of Dr. Noel, and the other group portraits of the officers of the Tennessee State Association for 1867, kindly loaned us for the purpose by Dr. Oren G. Oliver, Nashville, present incumbent of the presidential office, to whom our thanks are due for this and other courtesies.

Copies of this issue of The Dental Summary are being mailed to every member of the Tennessee State Association, whether they are subscribers or not. If not, they should be. Anyhow, every member will want to preserve this copy for Dr. Noel's paper if for no other reason.—G. E. H.

A 500-foot bridge across the Willamette river at Oregon City, Oregon, was built in 13 hours. Every part was built to the exact size and laid out on the river bank before any assembling was attempted.

Eighty-one thousand six hundred and fifty-one tourists visited the Yellowstone National Park during 1921

There are now more than 1,500,000 radio receiving sets in the United States and the radio manufacturers in New York report more than \$30,000,000 in unfilled orders.

LOWER DENTURE CONSTRUCTION WITH ESPECIAL
REFERENCE TO RETENTION*

BY BOWEN K. BOWEN, D.D.S., NASHVILLE, TENN.

I APPRECIATE VERY DEEPLY the invitation from your program committee to appear before you as an essayist, and feel keenly the responsibility I have assumed in endeavoring to present for your consideration a phase of plate prosthesis which is entirely new.

Before beginning the discussion of my subject I feel that I must express my very deep appreciation of the assistance and encouragement given me by my friends and confreres at home. During the past six months I have fitted many mouths with lower dentures made after the technic which I now bring for your consideration, and it has been my pleasure to call in my professional neighbors



Fig. 1

Fig. 1—Mandible from below, showing how lingual flange of plate stands away from inner surface; impression taken after old method, forcing tissues out of normal position.

that they might see the results attained. Their words of encouragement have been an inspiration toward a closer study of the problems involved.

I am going to ask that you give this subject your very careful consideration and refrain from expressing an opinion, or passing judgment on the merit or lack of merit of this technic until you have fully understood just what is involved in this new departure in lower denture technic.

Nine men in ten after seeing one of these dentures inserted in a mouth will walk away and remark: "Old Doctor So-and-so did that years ago and failed; the tissues simply will not tolerate the extension of a plate below the mylohyoid ridge". The essayist

*Read before the Tennessee State Dental Society, May, 1922.

wishes to state now, as emphatically as he knows how, that he does *not* extend the plate below the mylohyoid ridge.

I have chosen as a title to my paper "Lower Denture Construc-

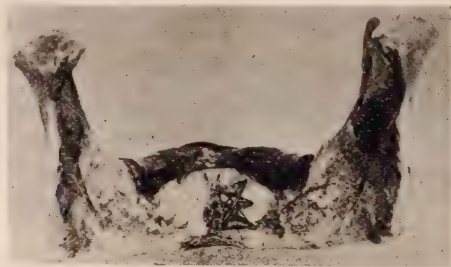


Fig. 2

Fig. 2—Shows how plate made after method shown in Fig. 1 would have to be cut away before tissues would tolerate its presence.

tion With Especial Reference to Retention." The principle involved in the new technic is that of securing a mechanical retention by means of flanges extended into or over certain areas.

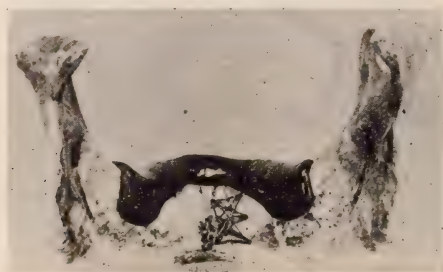


Fig. 3

Fig. 3—Shows perfect lingual adaptation of plate in effort to secure retention of plate beneath the mylohyoid ridge. This can only be worn about twenty-four hours, by which time large ulcers would appear as a result of this flange cutting into the fibers of the mylohyoid muscle.

Before taking up the detail of this technic I feel that I should publicly recognize the great work that has been done in the past by such men as Gysi, Wilson, Hall, House, and all those pioneers who preceded them and worked so faithfully to perfect our plate technic until it has reached its present state of perfection.

The profession never will be able to repay these men for their untiring efforts. The work of Geo. H. Wilson deserves especial notice for he has done more, possibly, than any other one man to perfect plate technic.

When, a few years ago, Rupert E. Hall gave the profession his improved technic of impression-taking which enabled us to extend the periphery of our lower dentures into the mucous fold, thus

securing a more perfect peripheral adaptation, and therefore a more perfect retention, it seemed that we had taken a long step forward. I believe you will agree, however, that this technic has been almost entirely discarded, except in a few instances where the method is especially indicated. We are still depending upon the force of gravity and the patient's dexterity as a juggler to maintain stability of our lower dentures.

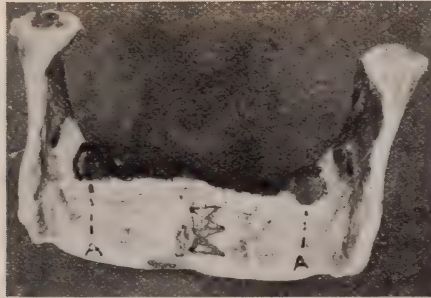


Fig. 4

Fig. 4—Shows correct outline of base plate for denture made after the new technic. A. A. show the extensions of the lingual flange between the mylohyoid muscle and the pterygomandibular ligament.

Dr. Hall advocated the extension of the periphery of the denture into the mucous fold, and in some instances the lingual flange was carried under the tongue. All of this was for the purpose of securing a more perfect peripheral adaptation and therefore a more positive atmospheric pressure. Geo. H. Wilson coined for him the expression "extension for retention," which, with a slight modification, was borrowed from the late G. V. Black.

In solving the problem of retention as applicable to lower dentures the essayist has taken the opposite extreme from that as advocated by Hall, viz., the almost complete elimination of the buccal and lingual flanges, and yet securing an almost perfect retention.

There is a law in physics that, "Force applied directly or indirectly against an inclined plane is exerted in a line at right angles to the surface of the plane." The side of the alveolar ridge being an inclined plane, it follows that the stress of mastication is directed in a manner to dislodge the denture laterally. To overcome this tendency to lateral displacement we have in the past depended on the lingual flange. In the case of the low, flat ridge, where this lingual flange could not be used, the patient developed himself into an expert juggler if he succeeded in using the denture as a masticating apparatus.

The low, flat and broad ridge is capable of giving the greatest efficiency in mastication if the stability of the denture can be secured.

This is evident when we consider that the low, flat and broad ridge gives a greater area over which the force of mastication can be directed. Flattening the cusps in such cases has helped to some extent to increase the stability of the plate, but masticating efficiency is very much reduced.

With your close attention to the details of my clinic I think I can convince you that it will be just as easy to secure perfect stability of a lower denture on the low, flat ridge as on the high, narrow ridge.



Fig. 5

Fig. 5—Shows relative position of plate extension to adjacent soft tissues (5) Area covered by plate extension. (1) External pterygoid muscle. (2) Internal pterygoid muscle. (3) Inferior dental nerve, (4) Lingual nerve.

While the force of mastication has a tendency to displace the denture laterally, we find that the force of the incision has a tendency to dislodge the denture by tilting it off the ridge in the molar area. To overcome this in the past we have resorted to an arrangement of the teeth referred to as the "three-point contact." This is a very fine theory, and works well with chewing gum or corborundum powder, but when a morsel of food of sufficient thickness to really separate the teeth is placed in the mouth, this theory goes glim-

mering, and the so called "three-point contact" is no more. In dentures made after the new technic we do not need this three-point contact for retention, as the stress applied to the incisors in incision of food cannot dislodge the plate. In the average dentures worn to-day, we have fairly good retention of the upper by atmospheric pressure. The force of mastication is applied to the morsel of food and the upper denture begins to fall; perfect peripheral adaptation prevents the ingress of air, and a partial vacuum is



Fig. 6

Fig. 6—Shows relative position of lingual plate extension to the mylohyoid muscle. (1) External pterygoid muscle. (2) Internal pterygoid muscle (folded back). (3) Inferior dental nerve. (4) Lingual nerve. (5) Area available for plate extension. (6) Fibres of mylohyoid muscle.

created, bringing the pressure of the atmosphere over the plate to hold it in position. Not so with the lower. Gravity is overcome by the more powerful lever, and then the ingenuity of the patient as a juggler is put to the test.

A close study of the inner surface of the mandible reveals the mylohyoid ridge running obliquely upward and backward from a point under the apex of the bicuspid tooth to the alveolar border opposite the third molar. The mylohyoid muscle is attached to this

ridge throughout its entire length, and with its fellow of the opposite side, forms the floor of the mouth. Above and behind the extreme distal end of this ridge we have the superior constrictor of the pharynx and the pterygomandibular ligament attached to the inner surface of the ramus. Between these two points, viz., both the distal end of the mylohyoid ridge and the attachment of the pterygomandibular ligament and the superior constrictor of the pharynx, we have an area covered with mucous membrane that will tolerate the presence of a plate extension.



Fig. 7

Fig. 7—Bowen Tray, showing under surface. A. A. Hinged flanges, B. Thum's screw for holding halves of tray together at C.

As the text-books on anatomy do not give this particular area a name, I have referred to it as the retro-alveolar fossa. I have so named it that there may be no possible misunderstanding as to just where this plate extension is made.

A further study of the inner surface of the mandible reveals that the crest of the alveolar ridge is well within the internal oblique line of the anterior margin of the ramus. At the extreme distal end of the mylohyoid ridge the inner surface of the mandible turns sharply away from the sagittal plane. This gives us an undercut into which the plate extension is carried. This area forms an opposing undercut with its fellow of the opposite side.

Many are ready to state that the tissues will not tolerate these extensions. The fact remains that the essayist has used these extensions on nearly fifty cases, all of which are giving good service and being worn in comfort. Two patients have been brought to this

meeting, and those interested will have an opportunity of examining these mouths and getting first-hand information from the patients.

I desire at this time to especially thank the Department of Plate Prosthesis of Vanderbilt University for their co-operation in working out the technic necessary to get these results. For quite a while I was getting varied degrees of success, due to the fact that in some cases I was allowing my flange to impinge on the distal fibers of the mylohyoid muscle and the superior constrictor of the pharynx. It was my work with Dr. Ewell Neil in the dissecting room at Vanderbilt that enabled me to perfect this technic to a point where our results are uniform and satisfactory.

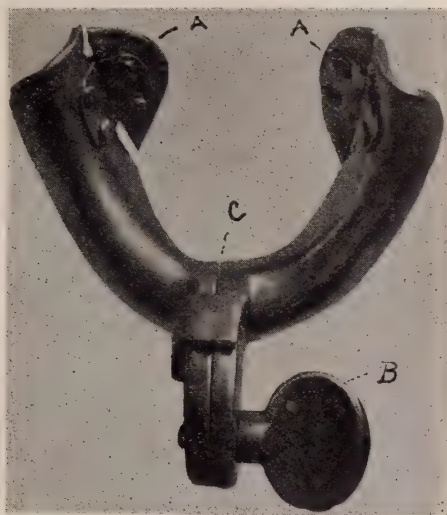


Fig. 8

Fig. 8—Bowen Tray, showing upper surface. A. A. Hinged flanges. B. Thumb screw for holding halves of tray together at C.

In making these dentures a special technic must be followed in securing an impression. I feel, however, that it would be a waste of time to attempt to cover that in this paper as the clinic would ultimately be necessary for you to acquire this technic. If those who are interested will attend my clinic and be close observers, I am quite sure that any man of ordinary ability can go home and get the same results which I have been getting for the past six months.

May I just add that if this can be done, we surely owe it to our patients to go home and give them more stable lower dentures. No man is just to himself who does not give to his patients the highest type of service of which he is capable, and the fee charged should be commensurate with the service rendered. If you are giving to your patients, dentures that have to be juggled, your fee

may now be too high. If you will master this technic and call these patients in and give them new dentures made accordingly, you may have the privilege of naming your fee within reasonable limits and the patient will cheerfully pay it. The greatest returns will come, however, in the satisfaction of knowing that you have rendered a real service for which you have the everlasting gratitude of your patient. You will sleep well, and dissatisfied patients will not haunt you in your dreams.



Fig. 9

Fig. 9—Bowen Tray, with thumb screw removed and tray separated in halves. A. A. Hinged flanges. B. Thumb screw.

If my work along this line will result in taking some of the worry and drudgery from your daily task, I shall be more than satisfied.

DISCUSSION

DR. HUGH O'NEIL, NASHVILLE: I have the good fortune to have an office next to that of Dr. Bowen, and I believe you will reach the conclusion that Dr. Bowen has made for himself a name. The average man will look casually at what he is doing, and go away and say he cannot do it. I did that same thing for six months. He would call me into his office and show me cases, and I would say, "That is fine," and he would shake the patient's head, and so on, and I would go out of his office saying, "You will have to cut them off later." Two months ago Dr. Bowen called me into his office and showed me a case and said, "This was put in two weeks ago and it hasn't been touched." And the patient said, "Yes, and I can chew a steak as well as you can." Dr. Bowen doesn't get his retention through the mylohyoid ridge. Then we went into the dissecting room and did some work.

Dr. Bowen has done something that I do not believe was ever done before. If it was done in the past, it was an accident, and the fellow who did it didn't know how he did it, and did not pass it on to the profession.

I have seen fifteen or twenty of these cases, and I know they are giving perfect service. You may ask, "Do not these plates irritate?" Surely they do. Do you know of a plate made under any method that does not? The proposition is to find out just what Dr. Bowen is doing, so that when they do irritate after you have made them, and the patient returns, you will know how to take care of them without ruining your denture. It may seem incredible, but I saw a plate Dr. Bowen put in for a patient who had a mouth that would be considered a hopeless case, because the buccinator muscle and the mylohyoid muscle joined hands across the crest of the ridge, and the crest of the ridge from the ascending ramus forward was on an inclined plane of about forty degrees, and it went in the other direction at about thirty degrees. Dr. Bowen put a denture made this way into that man's mouth, and he has been wearing it three weeks and going to the restaurant and eating his food, and he has better retention with that than with a plate of the ordinary kind. He made a plate for another patient, one of our leading attorneys. Dr. Bowen went to the hospital to take the impression. He put the plate in, and it has not been touched but once. That man wrote a check for \$200 for that denture, and it certainly was earned.

You cannot get this technic from an essay, but if you are interested, attend Dr. Bowen's clinic. I have been wearing false teeth for ten years. Dr. Bowen put one of those dentures in for me last Friday, and I will assure you that you cannot pull this denture from the ridge by any force you might apply in the direction that might come from the mastication of food.

(In private conversation with Dr. L. L. Sheffield, the writer asked his opinion of Dr. Bowen's technic. In reply he said, "He certainly has something very well worth while."—G. E. H.)

THE heavy steel doors of the Ohio penitentiary have closed on a former chief justice of the municipal court of Cleveland, now a convicted perjurer serving a term of from 1 to 10 years. The former judge is now a comrade of thugs, crooks and gunmen, many of whom he himself sent to prison.

DENTAL ECONOMICS—PSYCHOLOGICAL AND PRACTICAL*

BY GEORGE E. HARTER, TOLEDO, OHIO

WEBSTER DEFINES "Economics" as the "science that investigates the conditions and laws that affect the production, distribution, and consumption of wealth." The definition applies generally, of course, to all sources and manners by and through which wealth is gathered together, distributed and used up. For our purposes we will add to it the further and more definite phrase: "Through or by the practice of dentistry."

It has been my experience during the past fourteen years that the average dentist requires positively *no* instruction or help in the *distribution* of whatever of wealth may fall into his hands. Indeed, it would be no flattery to say of him that he is past-master in the art of distribution, sometimes seemingly for the sole purpose that others may enjoy.

It would be interesting, instructive, perhaps amusing, possibly tragic, to know just how many gold mines, orange groves, rubber plantations, oil wells, gold-from-sea-water reclamation plants, and even dental manufacturing plants and supply houses dentists have bought and paid for during the past decade—and presented in fee-simple to the other fellow!

It would seem that the title "Economics" applied to that method of handling the hard-earnings of a dental practice is a rank misnomer; and that "spendthriftics" would be a far more fitting term. However, under our definition both accumulation and distribution are included and both shall be considered, particularly because the remarkable facility with which the average dentist parts with his money has gained for him an insignia of the first degree in the ancient if not honorable order of E. Z. Mark, only M. D.'s, teachers, lawyers and preachers standing before him within the sacred precincts of the temple devoted to the worshippers of the goddess of unthrift.

"Economics," therefore, is the science and practice of earning and spending; of income and outgo; receipts and expenditures generally; while Dental Economics, although a more definite term is far more inclusive, covering just about every professional consideration. For this reason it has seemed best to divide our topic under certain separate heads, and consider each as briefly, succinctly, graphically and helpfully as possible, by no means overlooking the mental or psychological aspect of each. These heads naturally suggest themselves as follows:

Disposition—The nature and character of the man himself.

Preparation—Physical, Educational, Social or Cultural.

Practice; Fees; Collections; Expenditures and Investments.

* Read before the Tennessee State Dental Association, May, 1922, and ordered printed for distribution. Also, in substance, before the Arkansas State Society, March, 1922, and other dental organizations.

So much there is that might and should be taught under each of these heads that each one of them should have at least as much time as that assigned to cover the entire subject, most of them three times as much; and I do not hesitate to say that no dentist nor any other professional man need hope to absorb the things that he should know, the principles underlying the accumulation and care of money, to say nothing of its steady breeding along the lines laid down by Jacob in the handling of the flocks and herds of his father-in-law Laban, until classes are organized for the sole purpose of studying these matters; and at least one full week every year be devoted to pumping dry some man who knows his way through the snares and pitfalls of financial progress, and who is willing to be pumped. Neither do I hesitate to say that the time devoted to these subjects in the manner suggested or any other manner that accomplishes results would be worth many times all that it possibly could cost. I have had the satisfaction of being told that a single suggestion of mine has been worth many thousands of dollars to one of my hearers. And this is not remarkable, since, what the average professional man knows about finance, about the care of money most strenuously earned at the dental chair, as an instance, would make an angel weep or the devil laugh.

Almost every year two or three examples of dental unthrift come under my notice; some of them so tragic that at times I am strongly tempted to throw up work that I love and offer my services for the remainder of my life to instruction and advice along these lines. It is not at all unusual to find after a dentist's death his safe or safety deposit box stuffed with worthless securities of one kind and another, the accumulation of a lifetime, representing what would have been an ample competence if wisely used, the entire lot being worth less than enough to provide decent burial, to say nothing about provision for his family. And the heart-breaking part of it all is that every penny invested in blue-sky, in patent post-holes, in wild-cat oil wells, in gold-mines that never can be made to produce an ounce of metal at a profit,* was taken out of income at somebody's expense, at some sacrifice, with the one sole and most creditable aim of providing for that family.

Since dentistry is a highly specialized profession and in no sense a business or trade, the nature and character of those entering it are far more important factors in success or failure than they possibly can be in commercial or mechanical life. In fact, it seems to me to be the *most* important factor, and will be given first consideration. Our first subdivision then, is:

DISPOSITION:

This has to do with nature, character, inclination, view-point of the man himself in relation to the profession that he has chosen; upon what

* For the past three years, I am told, the average cost of mining gold, in established mines, has been \$8.00 per ounce more than the government price paid for the metal.

he, himself, essentially is. You know the hoary old maxim: "You cannot make a silk purse out of a sow's ear"; and, while within a month or two, science has done just that in an experimental way, the truth of the application of the aphorism so far as professional life generally, and dentistry in particular, is concerned, is just as apt as ever it was; and, as my experience widens and deepens, and my discrimination becomes more and more acute, I cannot at times refrain from speculating as to how many good farmers, planters, machinists and blacksmiths; how many first-class speculators and gamblers, preachers and business men, have been spoiled in the making of mighty poor dentists.

If you could sit at my desk and have shown to you the almost unbelievably wretched attempts at models and casts, impressions and finished work that come to our dental laboratory for one purpose or another, you would not wonder that at times I grow discouraged. Some of these show not only want of knowledge as to what should be done, but a total lack of manual dexterity in trying to do it. Any man who has had experiences similar to mine will tell you the same thing. As confirmation I suggest that you read an article by your own Memphis man, Mr. Roth, published in the June, '21, number of your magazine, *THE DENTAL SUMMARY*.

The dentist requires, I think, vastly more differing characteristics than does any other man, professional or otherwise. He must be a philosopher, a teacher, a counsellor, a confidential friend—sort of a "father confessor" as it were—a mechanic; he must be a laborer and a gentleman in the same minute; above all he must be a Professional Man at heart. He must have professional ideals and aims; and these aims are very different to those that may be held without detriment by the man engaged in business pursuits.

Service; Helpfulness; Beneficence; giving all he can for every penny he gets; thoughtfulness for others; self-sacrifice for the benefit of others—ideals like these must make up the professional spirit, lacking in which no man need hope to be a success in the practice of dentistry, no matter how well equipped he may be in other particulars.

This professional disposition cannot successfully be assumed. It must be natural and it must be real; and it must penetrate and animate the man through and through. No imitation of it will do at all.

Until a few years ago, and for more than thirty years, I had the honor of counting among my very best and closest friends the Dean of the faculty of one of our Ohio medical colleges, a man who had been demonstrator of anatomy for more than forty years. As is well known medical graduates are required to subscribe to what is known as the Hippocratic Oath, pledging themselves to keep constantly in mind their duty as professional men, rendering the best service of which they are capable at all times and under all circumstances, regardless of personal reward. This honored friend of mine had handed diplomas to many hundreds of graduates, to each of whom the oath had been administered by him. And from him I

have the emphatic statement that in all his experience he never had known one man to succeed in the practice of medicine, even in a financial sense, who had taken that oath merely as a matter of form. As he expressed it: "No man ever succeeded in medicine who signed that oath with the point of his pen only."

The welfare of the patient must ever be uppermost in the dental consciousness. In that consciousness he must live, and move and have his professional being. It must be so prominently apparent in everything said and done that the patient will be made to *feel* its reality, establishing an understanding and a sympathy that is worth everything to both patient and practitioner.

No such obligation rests upon the man engaged in commercial pursuits, although many such men are endowed with and daily manifest such ethical characteristics. The business man plays an entirely different game, played by altogether different rules, quite fair rules, too, as he sees them, because everybody with whom he plays is supposed to know the game and its rules. *Caveat emptor*: let the buyer beware, might about as well be *Cave canem*: lookout for the dog! "Every fellow for himself and the devil take the hindmost." To get all that one can for the least possible. To beat the other fellow to it. To benefit all one possibly can from the necessities of others.

Do you know of such men as this in dentistry? I am sorry to say that there are such. But they are not professional men. They are pirates who mask their real nature and purposes behind that accommodating camouflage, a college diploma, and use their State license and registration as the pot-hunter uses decoy-ducks. And their ultimate failure is sure.

Assuming the garb of professionalism, you must be true-blue, all the way through. If you find that you cannot do that, better get out of dentistry and take up something in which you can express yourself fully and completely, in which you can be honest with yourself, and with the world. If ever there was a time when real men and women were needed, that time is now, when we are just waking up "in the morning of the night before," from a period of financial debauch, characterized by Sir Winston Churchill in a recent book as "The Jazz Mind," the don't-give-a-damn-so-we-have-a-good-time mind, a state of mind and a state of business wholly and entirely the result of dishonesty in business and mercantile life, high and low. For, bear in mind, there are no such things as physical causes, financial causes, business causes. Business does not just happen; it does not make itself good or bad, fair or unfair; and business does not make men. Business is made by men, after a pattern existing in men's minds. That is the seat, the *fons et origo*, of all causes. About every twenty years we have such business conditions as that out of which we are just now beginning to emerge, brought about by such general dishonesty that all confidence is lost, and chaos follows. Business is almost entirely a matter of confidence; and when that is lost on account of the decline of ethics in

the business world, we always have depression which lasts until other ideals are born again and resume their sway.

Honesty alone never got any man anywhere, of course. Honesty is a duty each man owes to himself, and is its own sufficient reward. But until a man has made himself honest with himself, he cannot put the best there is in him into his work.

PREPARATION :

Here we find again the most unusual and seemingly contradictory requirements. It is necessary that the dentist should spend from four to six years of his life in purely vocational education in the college; then come out and enter practice that requires him to forget almost everything except the bare fundamentals of anatomy and one thing or another, and learn his profession all over again. Nor is that all of it. He must keep on forgetting and relearning. He must forget not only nearly all that he learned in college, but each year, just about, he must forget nearly all that he learned last year. To keep abreast of the rapid strides that dentistry is making, the dentist must revise his theory from top to bottom, and start all over again nearly every year. When I compare dental theories and practice with those of even five years ago, it seems almost like a new profession, except that the mouth and teeth still furnish the amphitheatre for professional activities.

Science, theory, there must be in plenty. Back of every operation there must be a reason that the dentist should be able to state and state *clearly* to his patient—*must* be able so to do, if he aims to establish between himself and the patient that bond of sympathy and confidence that is so necessary between the two if comfortable and successful association along all lines, particularly financial lines, is to be established and maintained.

Successful practice also requires a very high degree of delicate and precise manual dexterity. And that means complete control of both mind and body. As possibly in no other walk in life is the dentist called upon to be the complete master in his own house—his body. And right here what I have to say to you along this line will be found to differ widely from what may be called conventional or orthodox psychology. If it were not so, this phase of my paper might as well be omitted; for we all know how utterly futile from the professional standpoint are the so-called instructions handed out by the average self-appointed and so-called instructor along these lines. Follow me with what patience you can, and I promise you that you shall be more than satisfied.

In obtaining the necessary control, in becoming the unquestioned master of the body, we are not without very clear and definite instructions that have come down to us from the Wisdom of the Ages, which lack of time forbids detailing here. Instruction covering periods of time equal to that assigned to me on this occasion, during every week for an entire year, would be none too much for such a subject. The first and most important

thing of all is to realize just what you are, what Man is, what this thing of being a Man really means.

In the depths of the great Egyptian pyramid, Gizeh, which was built for the one sole purpose of initiation into what are known to us as the Mysteries, protected by vows of the most complete secrecy, a secrecy so rigid that the term "Hermetically Sealed" had its origin in that condition, Hermes the Great, upon whose life and teachings fundamentally rest every great science, philosophy and religion that the world ever has known or is likely ever to know, taught his chosen few that "Man IS consciousness; he IS life; he IS energy." And: "Man IS a stable center of consciousness; individualized by his own experiences, capable of infinite expansion."

In a far later day and in our own country, Ralph Waldo Emerson has recorded precisely the same instructions: "It is not correct to say that God has endowed man with mind. To whatever extent man has mind to that extent he IS God."

Try to realize this; and also realize that our bodies are made of "the dust of the earth"; that is, of cells, made up of molecules, composed in their turn of still finer particles known as atoms, formed by the union of ions, which, once more, are compounded of electrons; and that at the center of each of these there is a Little Mind, intelligence, consciousness; and that this cell-mind as it may be called, is "of the earth earthy"; manifesting itself solely through elemental feelings, desires and passions; and that insofar as a man is Human he refuses to be moved or controlled by these elemental things, but imposes his own mind, the Divine part of him, upon his instrument, the body, which he realizes fully to be his servant, his tool, and never for a moment, identifies himself with his body as that body, or any part of it.

There is in every one of us Two Persons, one a Big Man and the other a Little Man. The one is the Man Himself, who should be the ruler of the body and the mind. The other is simply the sum-total of the bodily or physical consciousness. Which are YOU? Which do you want to be—the Big Man or the little man? In no other calling, in no other walk of life, outside of the dental and medical professions, is it so essentially necessary that a man should identify himself with the Big Man, know himself and think of himself as being that Big Man.

Having identified yourself with and as the Big Man, and determined that you will be master in your own house, the next thing is to assume rulership, make yourself known as the Master. The first, most important rule that has come down to us, and the only one that can be given to you now is this:

"NEVER DO ANYTHING WITHOUT YOUR OWN COMPLETE CONSENT."

When considering any line of action if you find a doubt anywhere, a question anywhere, do not take the action contemplated. In business, particularly when considering investments, we have a slight modification in the wording of this rule: "In case of doubt do nothing," amounting to

precisely the same thing, doubtless derived from the ancient teachings. This means that you are to act as a unit, to put the whole of you into all that you do, to be entirely honest with yourself, to see to it that your intuitions, your conscience, your intellect and your desires agree with each other in all of your professional relations with your patients. Can you imagine anything that possibly could make you so powerful, so successful as this? Try it and see.

Among many other requirements, the dentist must keep his body in the most perfect adjustment and training. I saw a dentist make an extraction not long ago—a difficult one, requiring every ounce of strength that he could command. Every movement was the perfection of slow, deliberate grace and skill; no hesitation and no hurry; no doubt or flurry. To accomplish this requires regular, systematic and correct exercise, general and local. I have found a very simple method to be very helpful in many cases, a method that will be given personally to all who ask for it.

The personal appearance of the dentist must leave nothing to be desired; cleanliness, neatness, a clean skin, a pure, sweet breath made so by artificial means when necessary; the daily bath; proper diet that shall feed the cells instead of the palate—all these things, properly worked out and developed, are necessary to the maintenance of the dignity of a professional gentleman.

There must be general and continuous education, development, culture along all lines of human development and human interest. To be a truly successful and high-grade professional man you must know *everything* about one thing—your profession—and *something* about everything.

It frequently is asked why it is that the dentist does not occupy, as a rule, a position in the social world equal to that of the physician, the lawyer, the professor or the clergy. What is the answer? Simply that he lacks culture—cultural education. And why does he lack culture? Because he has, as a rule, contented himself with vocational education. Vocational education is quite enough for the barber, the machinist, the business man; but by no means is it enough for the professional man.

How can the busy dentist obtain cultural education? Very easily. One hour every day, applied in the right direction, will make a new man of a dentist in a year. And he will find it pays enormous dividends. Not only will he learn to think, but he will learn to *learn* from everything he sees. His professional work will become easier. He will be sought for socially, because the attraction that comes with culture will become his.

It may not be amiss to recite here briefly the history of a cultural movement in the city of New York, which began in a very simple manner in a popular restaurant and has since spread to all quarters of the earth. It seems that two or three men of known literary and other ability were in the habit of meeting at a certain restaurant for the noon-day luncheon, and there giving to each other a few brief but interesting and helpful points along the line of personal endeavor to which each devoted his life. One

of these men was a well-known writer, another was an illustrator; another was a historian; and it required no very close observation to satisfy everybody in the neighborhood of their table that the conversations carried on there were of more than usual interest.

One day a banker who also took his luncheon at the restaurant mentioned approached their table, and, with an apology for intruding, asked what it was that seemed so interesting to all of them. Upon being informed, he asked permission to join them. Soon others were attracted until the little table had to be exchanged for a much larger one; finally some sixty men, in many different walks of life, began to meet each day, when an agreement was made to the effect that each man should bring with him some ONE fact connected with his work and give it to the others—making that luncheon-table a veritable exchange-market for the things that every man should know and should want to know in order that he might feel himself to be a man of culture, able to hold his own in any society in which he might be thrown. The artist told of his ideals and his work; the banker talked of money, finance, investments; the traveler gave accounts of interesting incidents in foreign lands, etc. Soon the tacit organization grew too large for its quarters, when it was determined to effect a permanent organization, capitalize it to the extent necessary and issue a little magazine, for distribution among its members.

Such, in brief, was the beginning of what has come to be known as The Mentor Society, publishers of the Mentor Magazine, distinguished for one particular peculiarity: The contents of each number is limited to a single subject, about which enough is told and illustrated to make each reader reasonably intelligent upon that subject. One number has been devoted, as an instance, to oriental rugs; others to period furniture; to children in art; still others to American poets, American musicians, game birds of America, song birds, architecture, literature of various kinds and periods, big game in Africa, and very many others.

While subscription to the magazine is limited strictly to members of the Mentor Society, membership is comparatively easy, since it requires only the recommendation of one already a member. The cost is very little and you cannot do better than avail yourselves of this easy and very inexpensive method of obtaining an all round knowledge of subjects that every cultured man should know. (If any reader cares to become a member of this cultural society, I shall be glad to forward his name on request.—G. E. H.)

This is but one of many methods open to the dentist who desires to make of himself something more than merely a skillful operator.

Read things that are a little difficult for you at first. Do not read the things that interest the common or elemental mind except for relaxation, and *tell yourself that is why you read them*. Interest yourself in civic work; boy-scout work, and the like; join a good club; meet the right people; make yourself known as a man among men in your community.

Be a leader among your neighbors. Do not wait for somebody else to see something that should be done for your town. See it yourself, and inaugurate the movement to bring it about.

If you are beginning to wonder what all this has to do with earning and spending the dental income, just ask the man who is doing it! Look about you; pick out the men who seem to be prepared in an all-around way; the man whose position you rather envy, and ask yourself what he has that you lack. Notice what he means in social and civic life. Notice the class of patients that wait his convenience and pay his bills. His position didn't just happen. Your opportunity is as great as his. Circumstances are nothing. Everything depends upon the man.

The next phase of our subject is—

PRACTICE

Every genuine professional man finds himself handicapped in the struggle for financial independence by the yoke he voluntarily puts about his neck when he enters the profession. He feels that he must get forward and that he must be professional. He knows he must not lose sight of that. To be professional means to make Service the first consideration; means giving all he can for the fees he gets. And it means more than that. It means professional honesty; and professional honesty means that if a case presents that he knows that some other dentist can handle better than he can, he will refer that case to that other dentist, even though the two may be personal enemies. He is not doing it for the sake of the other dentist but for the good of the patient. He cannot afford to allow professional honesty to mean less than that. The wise man will not hold the penny so close to his eyes as to allow it to hide the dollar.

In meeting new patients the first few minutes probably will determine your ultimate success or failure with them. Welcome them kindly, courteously, but avoid the least taint of familiarity. Impress them with the sense of professional dignity and the attitude of service. Make patients understand the importance of your service to them; your motives; and the results that may be expected. Do not allow them to regard you merely as a repair-man, of little more importance than the barber or the cobbler—even of less importance than the manicurist or the hair-dresser if the patient be a woman. Many a lady thinks nothing of breaking a dental appointment who would almost break her own neck to keep an appointment with her hair-dresser. To both male and female patients emphasize appearance as well as health. Men may pretend that they do not care for appearances but they do, just the same.

Somebody is going to ask whether broken appointments should be paid for, and I may as well answer it right here. Certainly; but they need not and should not appear as an item in your bill. Appointment breakers should pay more than your ordinary basic fee. They not only consume your time, but they make you lose your stride sometimes for a whole day and they keep other people away who may need your services very much.

Above all, make your patients *know* that your service means their health, sanity, comfort and lengthened life. You must keep posted on all these things, and you must *make your patients understand that you know*. Take and read the dental magazines. I seriously advise that the dentists in each town contribute toward a fund to pay for a good clipping service. This means that you will receive clippings from the daily newspapers covering all the important doings within the profession: oral hygiene, child welfare, important talks and lectures, reports of free clinics like that at Rochester, for instance; all the important findings of research men, etc. These clippings may be passed around from one to the other. The cost will be little, a few dollars per month, all told maybe. And they will give you an endless fund of information that you can use with telling effect upon your patients. (I will gladly send, on request, addresses of clipping bureaus that I use.—G. E. H.)

Let your first interview with a patient be an impressive one, preferably conducted elsewhere than in the operating chair. I think every dentist should have an examination chair, in a separate room. Sit down, facing the patient, with the light back of you or at the side, where the patient's face will be clearly visible, and ask questions, just as an M. D. would do. You want mouth history and you want systemic history just as much as he does. You want to be able to judge whether the conditions you are about to find in the mouth are a part of a systemic picture of otherwise. Examine the mouth as you would in the case of school children, not minutely, at this time. Ask questions as to diet. Tell the patient the causes of dental diseases if you know. If you do not know, find out. I will be glad to help you. Tell them, also, what dental diseases may lead to. Instruct as to correct diet for the preservation of health and sanitary mouth conditions. Make positive statements. You may not be entirely correct, but you easily can know all that is definitely known. Don't hurry. Impress your patients with the idea that you want to be sure in your diagnosis for their sake.

Render your preliminary diagnosis, tell the patient what should be done and why, and either conduct her to your operating chair which has been made ready for you, or make an appointment for another day. In cities and large towns the latter always is preferable. You will, of course, relieve any pain that may be present at the first interview.

Tell your patient what you mean to do and why. Never ask patients what they want you to do. You know what should be done. Do that or nothing. If the patient decides against you, never mind; let her go. Preserve your own dignity, integrity and self-respect always. Maintain the right attitude and for every one that leaves you, two will hunt you up. You are showing the professional attitude that the people want and admire. That's the correct psychologic attitude. Get yourself right, stay right, and the rest will take care of itself.

Many of you are likely to breathe a sigh of relief when we come to our next division-heading—

FEES

It is an important factor, but by no means the most important. Your own attitude toward your profession, and your realization of your own complete responsibility for success or failure, are the most important factors in your life or the life of any other man.

There is but one correct basis for professional fees—the value of the service to the patient. This, and the comparative ability of each patient to pay, are the only factors that should be considered in fixing fees. You are the only possible judge of the value of your services. Judge them as you would similar work done in the mouths of other patients by other men. If there is a dentist in your acquaintance that you do not like, judge your work as you would feel like doing if he had done it. Do not confuse the amount of any of your fees with the sum you need as net income to live as you want to live and get ahead. That should, of course, be determined in advance, so that you may keep in touch with your income at all times. Totals are all you are interested in in daily practice, not the details. Sometimes a very brief operation, requiring but a short time, may be worth a great deal more to the patient than a protracted one. Charge on the basis of value only.

Of course you must know how much your practice is costing you. You must know your costs before you can arrive at any rational estimate of your necessary earnings.

Several years ago at Boston—don't forget, at Boston, the hub of the intellectual universe, where one expects to find, if anywhere, men who know their own business and know that they know it—I asked an audience of some three hundred Massachusetts dentists if they knew the total amount of their practice the previous year. Five or six of them raised their hands. I then asked them how many of them knew what the total cost of their practice had been during the same period. The same five or six raised their hands. They said they knew. I do not know whether they did or not. I then asked them what percentage of their receipts had to be spent to keep their practice running. Several of them said that they knew. Maybe they did. But every dentist *must* know from accurate records or expect to get into trouble by reason of rendering a false income-tax report to your Uncle Sam—and that old gentleman doesn't like excuses. He usually makes us pay for them as well as for our mistakes. That's a little way he has.

Of course, dentists are by no means the only people who do not know how to figure their costs. Far from it. There are state organizations of grocers and other trades who are doing all they can to educate their own people along these lines. Below there is an example or two of the way they are getting at it which is sure to be helpful to you, not because you are particularly interested in their profits, but because "business is business" and rests upon identical fundamental laws.

FROM COST BULLETIN NO. 2, STATE RETAIL GROCERS' ASSOCIATION

DOES THE PUBLIC KNOW?

Do your customers or your newspaper editors know what you mean when you say it costs you 25% to do business? As a general rule—NO!

But if you ask either your customers or the editors what profit you make when you buy an article for \$1.00 and sell it for \$1.50 they will say you make 50%, won't they? YES!

STOP!! .THINK!!

What profit *do* you make, and how are you going to get the public to understand it? In the first place, if it costs you 25% of your sales to do business, that means that from the proceeds of every sale of merchandise you must deduct 25% for expense before you can consider profit. Doesn't it?

Then if you buy an article for \$1.00 and sell it for \$1.50, neither you nor any one else knows what your profit is until you deduct your cost; and what is your cost and profit?

Wholesale price	\$1.00	Retail price	\$1.50
Expense 25% of \$1.50....	.37½	Cost	1.37½

Total cost	\$1.37½	Profit	\$.12½
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Your profit, then, is 12½ cents, which is 8⅓% of \$1.50, the retail price, or 12½% of \$1.00, the wholesale price.

Would figures prepared by your customers or your editors be very likely to look like yours? NO!

Won't they look like this—

Cost of goods	\$1.00
Selling price	1.50

Profit	\$.50 or 50%
--------------	---------------

Then they figure your net profit like this: Profit 50% (using their figure), less cost of doing business 25% (using your figure), leaving net profit on sale of 25%.

Will they think this an exorbitant profit for you to make? THEY CERTAINLY WILL!

On the contrary, every item of expense going into the article is included in the cost, as it ought to be, but did you ever hear a retailer talk about what his merchandise costs him?

Isn't this what the average merchant does in normal times:

1. Buys an article in New York for about 63c and pays freight amounting to about 2½c.....\$.65½
2. Pays his executive salaries and salaries of his office and warehouse employees for buying and handling the goods about 10
3. Pays landlord for rent, about..... .04
4. Pays local taxes, insurance, lighting, heat, depreciation, contributions for community welfare, etc., about..... .04½

5. Pays his ad writer and the newspapers for advertising the article, about	.01½
6. Pays his sales people for selling the article, about.....	.08½
Total.....	\$.94

The article is now ready for the customer marked for sale at \$1.00.

What is the cost? Is it 65½c, as 99% of retailers would say, leaving a gross profit of 34½c?

NO! It is not 65½c, but 94c, leaving a gross profit of 6c from which to pay the special federal taxes, set aside a reasonable amount for reserves, and to pay net earnings to the stockholders.

In estimating your costs be sure to get in all the items. You know what your income was last year, and what the cost was of conducting your practice. You can know what every dollar of receipts cost you. Reduce this to a percentage basis, and use it in your calculations for the running year.

Not long ago a dentist in attendance at a meeting before which I had the honor of appearing, told me that he had done a practice of \$7,000 gross the year before; that he and his wife had gone carefully over the records they had kept, and had decided that the practice had cost about \$4,700, leaving only \$2,300 as net income upon which to live, etc. I cannot accept their records as correct. If their cost had been but \$200 more, it would have shown the tremendous total of 70%. As nearly as I have been able to figure it out from the data given me by dentists, the cost of conducting the average dental practice lies somewhere around 40% of the total receipts. This has been checked up against reports from 1500 dentists in a north-central state, and no city practices were included. Therefore, I think you will be safe in using that figure. You should have your own figures to guide you, but if not use this until you get your own.

You must figure upon the cost of supplies, the cost of replacing worn or broken instruments, appliances, rent, help, postage, express, at least 10% for depreciation on furniture and that sort of equipment, another allowance for bad accounts, and still other amounts for anything that you think of that cost you money in the conduct of your practice, and that prevented you from getting money. Add all these amounts together and deduct from your total income for the previous year, and then decide whether the remainder is sufficient to maintain yourself and family in the manner that satisfies you and them, and leaves a snug little sum to add to your savings. If so, all right; if not, increase your rate. Do NOT charge for your services by the hour, but use these figures as a check upon your income day by day, as a basis, a standard, so that you may know that you are charging enough!

Suppose a case: In going over your matters as suggested, we will assume that you find that 40% of your total income must be paid out again to keep your practice running. Get this 40% into your mind; never forget it for a minute. Always calculate that of every dollar you take in forty cents must

go out again. If you average \$10 per day for a month, you know that your NET, that is, the total amount that you can use for YOURSELF, is only six dollars per day, and that six dollars per day is only about \$30 per week—\$1,560 per year. If that's enough, all right. I have no objections. But it would not be enough for me, and should not be enough for any dentist. If you agree with me, you will raise your fees. If you want a hundred dollars a week for yourself, you must make your gross income \$167 per week, either by increasing your fees or drawing to you a greater number of patients. I am not trying to detail this thing, only trying to show you how to think out your own problem, and the factors that must be considered.

In this connection I want to caution you against excessive fees. There certainly is a tendency in this direction that is hurting the practice in a financial way very seriously at this time. The public is beginning to talk about it. The lay newspapers are printing editorials about it. One dentist brought suit for \$165, and the court gave him \$45, and showed the public that the sum awarded was all that the service was worth, so far as the time and material consumed were concerned. That's all that a court could see. Value to the patient is an intangible thing, although a very real one. That value you must establish in the minds of your patients, while you have them in the chair. If you do that you will seldom need to sue a patient.

Then there is another viewpoint. Right straight through these dull times of deflation and readjustment, dentists who are charging on a moderate basis have been as busy as ever. They have been making money. Of course, a larger percentage than usual of their earnings have been booked, but as one of them said to me, "That will come in next summer when I need it." Many patients are avoiding the dentist, and doing without needed service because of high prices. I know of one dentist, at least, who is almost idle on account of high fees. Rather than reduce his fees where he is, he is looking about for a location elsewhere, so that he can moderate his charges and still "save his face."

There are men who can demand and get \$250 and more for a full denture; but their clients are drawn from the well-to-do, among whom they have an established reputation. (This does not, of course, include the few men in large cities who can charge and collect very high fees.) If anybody should ask me I would tell them that it is better to be busy at \$50 per plate or even a little less, than it is to sit around paring your nails at \$75. I believe that, were I practicing dentistry just at this time, I should give my patients their choice between the old-fashioned hurry-up method of making plates at around fifty dollars, and the newer, more accurate and much more costly method at a great deal more money. And, of course, every dentist has among his clientele a few families to whom he would not think of selling any but the best at the highest price. And this brings me to another point upon which I have very positive notions. I believe in the grading or classification of patients, and for the following reasons:

My idea of grading patients rests upon the broad consideration that all

the wealth in any community belongs to that community as a whole; as we say: "The wealth of the State," the "Wealth of America," etc. Of course, every community is made up of units, each person in the community being one of those units, and the "community wealth" is merely the total wealth of all of the units. On this basis, the man of much wealth is worth more to the community than the one who has little or none.

On the other hand, services rendered to any unit, any person, is rendered to the community as a whole. If you or anybody else renders a service that improves the health or well-being of a unit in the community, the health and well-being of the community as a whole is improved, and he who renders the service is entitled to a tangible reward in proportion to the value of the service rendered.

As such services rendered to a man of wealth are worth more in a financial sense to the *community* than similar services rendered to one who contributes but little to the community wealth, they are entitled to a correspondingly larger reward. Of course, as the unit, the person, represents the city, the community, he must pay out of his share of the general wealth.

The case is equally strong if we consider the individual only. The only thing anybody has is time. The time of a man earning \$10 per day is worth ten times as much as that of the man who earns only one dollar per day. Earning time is measured by two things—life and health. A man seldom earns very much after he is dead, and he doesn't do much better while he is alive if in poor health. A dentist who renders real service prolongs life and improves health, thereby lengthening the earning period, and improving the earning capacity during the entire period of life.

Viewed from either standpoint, that of the community or the individual, the dentist is entitled to greater reward for equal service rendered to different individuals, depending upon the financial value of the individual to the community or to himself.

Courts of law recognize this principle and give verdicts accordingly. A service that is worth only \$10 to the poor man of small income, may easily be worth \$100 to the wealthy man of large income.

Then there is the question of "charity work." Every professional man is bound by his professional obligation to render such service whenever it may be called for, to the limit of his ability. This is an obligation that cannot be side-stepped. However, every atom of such charity work is service rendered to the community and to every unit in it. And the community, through the individuals who make it up, should pay a properly proportionate reward to him who renders it. As society is at present constituted, the only way in which compensation can be obtained is by increasing fees for services rendered to those who have the largest share of the wealth of the community. And this is entirely fair, because the man who has much wealth has a larger financial stake in the welfare of the community as a whole than the man of small means.

Suppose that a man is able to earn just enough to support himself.

Suppose that such a man should lose his earning power altogether and be sent to the County Farm to be supported at the expense of the community. Every taxpayer in the community would be obliged to pay a part of the cost of that support. The man of much wealth, paying more taxes than the man of small means, would pay a larger proportion of that cost than the poor man. Now, suppose that your service prolongs indefinitely the earning power of such a man, and prevents his becoming a charge on the community. You have saved the small taxpayer a little, but you have saved the heavy taxpayer much in proportion. The slight addition to the fees of the wealthy to partially cover your cost in doing charity cases is very little in proportion to the amount you save him in taxes.

The case for "the classification of patients" as I see it, is as good as proved. It is tacitly accepted by those of large incomes, who usually expect to pay more than others, because they expect some special service on account of the position their money gives them. I know some who are offended when they are not asked to pay more, because they are vain of their wealth and want it to be recognized. Such people pay more for everything they buy. Of two articles of equal value but different prices, they will choose the more costly.

There is also the wealthy "tight wad" to be considered. Diplomacy may be called for, but he should pay in proportion to his ability.

COLLECTIONS:

Here is where most dentists shine—with the English reversed. The reason why, or one very cogent reason why, dentists are not good collectors is that they do not sell their services for their full value while they have the opportunity—with the patient in the chair. They do not tell them, as I am very sure that I should tell them, just how much and how great vital value each tooth has for its owner; the value and the specific relation of each tooth to every other part of the human economy; just what per cent of vital efficiency is lost with each extracted tooth, and just as much as I possibly could of the health-value of each preservative operation. And I should figure, and work, and calculate until I had a story to tell my patients that would send every one of them out of my office with the idea that something very valuable had been done for them. That is what I mean by selling services at **full value**.

I have a few words to say on the quoting of fees in advance. It all depends upon the class of patients you are serving, or, if of mixed classes, upon the individual patient. Some people would be offended if you told them the cost in advance. Tell your patients what it is that you mean to do; make them understand the value of your work *to them*. Then, if they ask the cost, it is well to tell them something, at least approximately. There are only a few operations that are of such nature as to allow the quoting of exact fees in advance. When and if you name a price, do it nonchalantly, as though it were not a matter of importance compared with the value of the work to them; and always name a price a little higher than you calculate.

When bills are *lower* than expected, payment is much easier than when they are higher. If you expect to pay a hundred and your bill is but ninety—well, you know how it is!

Do *not* render itemized statements. They smack too much of the commercial spirit that seeks to gain favor that profit may follow. Your service should be your only claim upon the confidence and esteem of your patients.

Let your statements read like this:

"June 30. To Professional Services Rendered.....\$40.00

"A detailed record of the service is on file in the office, and may be examined if desired."

A slip, or better, a card, neatly printed, should accompany each statement, something like this:

"Statements are rendered monthly, and payment is expected on or before the fifteenth of the month, whether the case is completed or otherwise."

Of course, all rules have their exceptions. Most of you have "regular" patients that may be depended upon to pay promptly on request, or even without request. These require special treatment. If the other sort don't pay promptly, send letters like the following, in the order given:

(On the fifteenth)

Dear Mr. Smith:

A statement of amount due for services was sent to you on the first of the month, requesting settlement on or before the fifteenth. You no doubt intended to remit promptly, but, as happens quite often, you probably laid the statement aside, and since have overlooked it.

Now that the matter is brought to your attention in this kindly manner, will you not dispose of it by prompt settlement? I assure you such action will be appreciated.

Very truly,

(On the twentieth)

Dear Mr. Smith:

Statement of your account, showing an amount due of \$40, was mailed to you on the first of the month. The matter was called to your attention on the fifteenth. Up to this time, remittance has not been received.

This letter is written to request settlement at this time, and I hope to hear from you promptly.

A return envelope is inclosed for your convenience.

(On the thirtieth)

Dear Mr. Smith:

My statement, mailed to your address on the first of the month, has been followed by two kindly requests for settlement of amount due, to none of which have I received response.

Overdue accounts are burdensome and costly, as you doubtless are well aware. As further time cannot be extended, immediate settlement is expected.

Very truly,

(On the tenth of the following month)

Dear Mr. Smith:

I shall regret being compelled to force the payment of your account. Such action is likely to cause you embarrassment, inconvenience and expense, and I trust you will not compel me to resort to that extreme.

You can spare both yourself and me this disagreeable experience only by making settlement not later than the seventeenth.

Very truly,

A true Kentuckian never reaches for his gun unless he means to use it. Be a Kentuckian. If your fourth request brings no response, hand the account to an attorney who has the reputation of getting results. It is then out of your hands. Refuse settlement even if offered except through your attorney. Make your slow-pay fellows understand that you mean what you say.

Of course, there may be many cases in which prompt payment is impossible; but there cannot be a case in which a debtor cannot write, or call, or phone, or send a friend to explain his delay. Your action is retribution for his carelessness, indifference, or dishonesty; not for his inability to pay.

Of course, you should have a card system or some form of what we call a "tickler," on which a record of your collection experience must be kept. You want to know; and you very particularly do not want to send a collection letter to a man after he has paid.

You should take all reasonable precautions to prevent the necessity of forced collections. You don't like them, neither do your patients; and the chances are that collections so made will cost you at least one patient. Learn the reputation and standing of your new patients before rendering more than preliminary service.

If there is a credit agency in town, become a subscriber. Inquire concerning every new patient not personally known to you immediately after first sitting. That's what your merchant would do if you asked him to open an account. If there is none, ask the drygoods man; he is likely to know, and he'll tell you if you have cultivated friendly relations with him, as you should do. Or—Ask your banker.

Maybe you haven't a banker; it is even possible that you are rather afraid of banks and bankers. You couldn't possibly make a greater mistake. Banks and bankers are interested in everything and everybody in a community that is constructive—that helps to build up. That's their business. Business friendship is the stock-in-trade of a banker. If you haven't made a business friend of some banker, let that be your first act as soon as you get home. You probably have lost more than you can afford on account of your mistaken attitude.

Select the bank that looks most "human" to you. If all look alike to you, select the one that does the most business. If you don't know, find out by **inquiring**.

Call on your banker; tell him that you would like to know him; that you want to know his bank, because you expect to use it hereafter; that you should have done so earlier, but somehow you hadn't just the right slant on things. Tell him that from that day on you mean to deposit every dollar you earn in his bank; that you are going to pay all bills over one dollar by check; and then *Do Those Things*.

Deposit *all* of your receipts in full every day. *All—In Full—Every Day*. Make a deposit of the sum total of your receipts in that bank every business day of the year. If you pass a day without receiving any money, you need not make a deposit that day! But see to it that you do not pass any other days.

Do not spend a dollar that has not passed through your bank. See that every dollar you spend for supplies, for help, for rent, for fuel, for living expense—yes, and for “that friendly little game,” first passes through that bank of yours.

(To be continued)

FOR 12 years a Florida farmer has raised watermelons on 1,000 acres. In all that time he has never shipped a melon but let them spoil in the fields except those he and his neighbors ate. The melons are grown exclusively for their seed, which are sold to planters of Florida, Georgia and other southern states.

VALUE OF HIGH-FREQUENCY IN DENTISTRY

BY DR. MILTON D. NEFF AND A. LONGORIA, CLEVELAND, OHIO

SUCCESS IN DENTISTRY might be attributed to him who secures the best restorations with greatest comfort to the patient. Best results are possible when fullest cooperation maintains between operator and patient, and that attitude is at once influenced when the patient finds out that the operator is capable of controlling pain. Pain and the rasping of the bur and stone are the only features which keep people away from the dentist.

It is the purpose of this presentation to give a synopsis of the dental uses of the high frequency current. The articles will outline the pre-operative, operative and post-operative uses. A trained assistant can take care of the pre-operative treatments described in this first paper.

The most successful dentist in a community is that one who has a reputation for skill and holds the confidence of his patients, by treating them without inflicting unnecessary pain. Let us grant then that a good reputation is the first asset to be gained. Not to disappoint the new patient with a first impression should be as carefully studied as a text book. Take for example the most inconvenient to handle: the one without an appointment, but with a real toothache.

It may be impossible for the dentist to give immediate personal attention. However the trained assistant can inquire the nature of the trouble and very discreetly tell in a few words of the relief afforded by "Violet Rays," secure the interest of the sufferer and in a few minutes actually have the patient composed and enough relieved to welcome the dentist's attention. More people stay away from the dentist for fear of being hurt than for any other reason.

There is much benefit derived from the pre-operative treatment aside from the change of the patient's disposition. The fact that the high frequency waves act as an anodyne to the over-wrought nerves, is the basic reason for the composure secured.

It is argued by some that there is a psychic effect produced to which should be attributed some of the success. A very level-headed associate, but without any experience with the high frequency once asserted:—"You would get the same results with a red incandescent bulb on the end of an electric wire. It is only the heat that does any good". Apparently the color of the bulb was expected to produce some psychic effect for good. However, heat is not always a good thing to apply for a toothache. High frequency accomplishes its be-

*The first of a series of three articles written for THE DENTAL SUMMARY.

nign effects with practically no heat, if directions are followed carefully. In fact so much depends upon following certain simple rules, that it is the purpose of this opening paper to go very much into detail with apologies to no one, as all of us can pick up good points from others who are doing similar work no matter what the subject may be.

While seating the patient in an ordinary chair and getting the high frequency ready, explain that this method uses only the spray of electricity. That it is soothing and healing and will give relief very quickly.



Fig. 1

Be very careful not to let the cord touch the patient under any circumstance; for a sharp sting will be felt which is likely to undo all the careful preparation your words have made. It does not give a shock, but it does startle and consequently disturbs the composure you wish to secure.

Sprinkle talcum on the part to be treated and start with a mild current. Hold your own finger on the electrode until well placed upon the patient's face. Move slowly about, keeping it in contact to prevent sparking. In passing over bony eminences such as cheek-bone or angle of jaw be quick and keep electrode flat against tissues. There is no sparking at all when the electrode is nestled against the cheek or side of the throat over the glands or in the hollows under the ear back of the ramus.

Strange to say, in view of our early understanding, electricity does penetrate glass, when it is induced through the electrode vacuum. It is best not to have the first-timer in the dental chair for this preliminary treatment, because of the probability of his touching some of the metal parts near him and being startled by the sharp sting. This can in no wise be considered to be what is known as a shock, but it is disturbing to say the least.

Even those who have become familiar with and secured remarkable benefit from the high frequency are often deterred from repeated use because of the carelessness of nurse or operator in some of these little particulars. Blame therefore should not be attached to the high frequency any more than to a good gun that goes off in careless hands.

If we are to get the greatest good out of the most wonderful force in nature, we must respect its claim to priority and be humbly willing to take second place in deference to its subtle power.

The manufacturers maintain that it is impossible to make an insulation heavy enough to keep the current inside the cord.

Everybody has learned to use the safety match. In fact we use many dangerous things with impunity every day; but electricity passed through the high frequency generator *is no longer dangerous*. It has been changed into a veritable spray which is both healing and stimulating. It has been aptly likened to the current of a river passing over a falls. That beautiful dashing spray bears no harm in it, even to the delicate flowers that grow within its reach.

My babies have all been brought up on it, and often use it voluntarily instead of medicines. To be sure they had to learn to handle it. Ages now 6, 8 and 10. They have learned not to touch the one using it, for they would be sparked, nor are they heedless about touching radiator or socket fixtures while electrode is in contact with their bodies. Practice should be devoted to its handling just as carefully as use of anaesthetics is studied and practiced before "trying it on a patient".

Points to practice: A—Isolation of patient from any one touching him, or his touching any large body of metal, especially one grounded, as a cuspidor (by way of its water conductivity), or dental engine, or steam radiator, or metal parts of dental chair.

B—Mental receptiveness propagated, while preparations are being made. Don't keep the sufferer waiting, while you give a little lecture on electricity. Your actions will speak surer than words and just a few well-put sentences will be better than none, for otherwise they may become apprehensive and decide they don't care to try it.

C—Now mark this; the majority of people will take it better the first time at the hands of a competent young lady assistant than from the dentist. She is supposed to be harmless and sympathetic. He is the epitome of all things else. In order to be competent the young lady must be familiar enough to be confident and really used to handling it. For if the novice sparks a new patient rather sharply, the patient is really worse off than without its use. Disgust, irritableness, even fright are apt to be factors that the dentist would then have to contend with beside the toothache. However rest assured nothing serious results from such carelessness, as may happen in giving an anaesthetic or even wielding the bur or forceps.

Relief is most readily secured by using surface electrode over the ascending ramus to quiet the irritated nerve trunk. Where swelling is present, it is essential to give the lymphatic glands of the neck fully half the attention. About fifteen minutes is ordinarily sufficient.

Where necessary to scale under painful swollen gums, an ex-
playing upon a préparation made up with equal parts of tannic acid
cellent pre-operative treatment consists of using a pyorrhea electrode,
and iodine in sixteen parts of glycerin. Leave small pellets of
cotton saturated with the solution in approximal spaces to feed out
the astringent as electrode passes over them. Use fully ten minutes
on either set of teeth with medium current. Incidentally it is of great
value to follow instrumentation. At that time merely wash out
pockets and spaces with water, then place pellets thin enough to be
inserted part way under the gums and proceed as before.



Fig. 2. "At home—after the dentist."

Many patients soon become confident enough to handle the work
themselves when saliva ejector has been provided and astringent
applied. Cases which are severe upon first presenting, are greatly re-
lieved immediately, and with a few days, attention will appear in-
consequential.

Editor's note:—The writers have been anxious to give us a plain simple outline
in this first paper which should encourage many to utilize this remarkable potent agency
Something of the scientific aspect of the subject will appear in the articles to be publish
ed consecutively.

765 Rose Bldg.

THE NECESSITY OF ROUTINE FULL-MOUTH ROENTGENOGRAMS IN DENTAL DIAGNOSIS

BY DONALD C. LYONS, D.D.S., ROCHESTER, MINNESOTA

FELLOW IN DENTAL SURGERY, THE MAYO FOUNDATION

THE FULL MOUTH roentgen-ray examination reveals many dental diseases and anomalies, conditions which for the most part would have escaped notice for many years and continued to act as possible foci of infection, or as accessories in nervous disturbances. Certain of these conditions may be potentially malignant, and if discovered and removed early, will save the patient a great deal of discomfort and perhaps even his life. Five cases illustrative of overlooked dental disease are herewith reported.

Case 1 (A383491), Mr. J. A., a man aged forty-two years, came to the clinic because of poor general health. He was referred to the dental department for examination. Full mouth roentgenograms revealed a large cyst with a calcified center in the region of the lower incisors (*Fig. 1*). The patient had not noticed pain or any

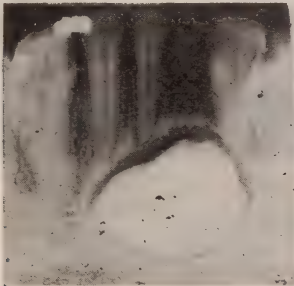


Fig. 1

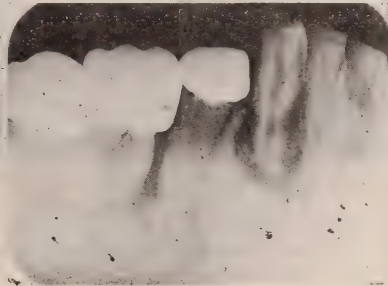


Fig. 2

Fig. 1—Calcified cyst which developed following extraction of tooth with abscess history.

Fig. 2—Results of trauma following kick by horse.

other disturbance in this area. Because of an abscess, the right central tooth had been extracted several years before, but evidently all the infection had not been removed. Roentgenograms had not been taken before or after this extraction. It is questionable whether the cyst was present at the time of the extraction, or whether the residual granuloma started it; the latter supposition is the more probable. The cyst had caused the death of the right lateral and the left central incisors and had involved the left lateral.

Case 2 (A387189), Mr. F. P., aged forty-five years, was referred to the dental department for routine roentgen-ray examination, because of epigastric pains. The roentgenograms showed large, evidently

chronic areas of rarefaction on the left bicuspid and first molar, some sclerosis of the mandible, and proliferative pericementitis of the left cuspid (*Fig. 2*). Thirty-two years before, the patient had been kicked on the left side of the face by a horse. For a short time after the accident, a fistula drained through an opening in the molar region, then closed. Occasionally the left side of the patient's face swelled, but soon subsided without pain, and, therefore, he did not regard it as important. The two molars and the bicuspid on the left had been crowned since the accident, but the teeth were not devitalized. The dentist also disregarded the symptoms which had followed the accident.

Most chronic abscesses and cysts do not manifest themselves by pain. They progressively destroy the bone for a long time before they break into the soft tissue; the patient then notices the swelling caused by the collection of pus or fluid. Without careful full mouth roentgen-ray examinations, checked by second examinations, these and many other dental diseases, as well as anomalies, will escape early attention by the dentist (*Fig. 3*).



Fig. 3

Fig. 3—Cystic condition not noticed until fistula formed.

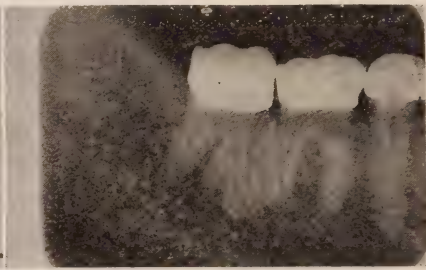


Fig. 4

Fig. 4—Osteosclerosis due to malocclusion.

The effect of malocclusion and other trauma on the periodontal membrane and the surrounding process is demonstrated by pain or roentgen-ray examination; only infrequently does pain give warning of the condition that is developing. Pericementitis, hypercementosis, osteosclerosis of the process, pulp stones, and so forth, conditions generally caused by long-continued irritation, such as malocclusion, undermine the health of the tooth and may cause the death of the pulp. Occasionally malocclusion or other trauma will cause pathologic conditions which may progress for a long time unnoticed, unless discovered by routine full-mouth roentgen-ray examination.

Case 3 (A386093), Mrs. A. T., aged thirty-four years, complained of nervous exhaustion and was examined in the dental department of the Clinic. Roentgenograms showed a well-developed area of osteosclerosis between the lower left first and second molars. This condition had been produced partly by malocclusion of the crowns with the opposing teeth (*Fig. 4*).

Case 4 (A307912), Mr. R. S., aged forty-five years, had an anterior upper bridge which seemed to strike the lower anteriors rather hard, especially the right central, lateral, and cuspid. The patient said he was well pleased with the bridge, that the lower teeth in question never had given him any trouble, although of late the right lateral seemed a bit loose. Roentgenograms revealed a large cyst at the roots of these teeth (*Fig. 5*). The maloccluding

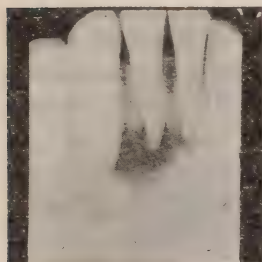


Fig. 5

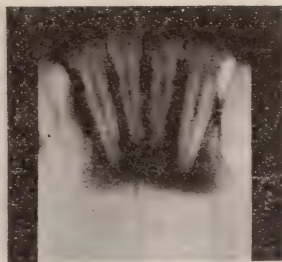


Fig. 6



Fig. 7

Fig. 5—Death of tooth and subsequent cystic formation apparently caused by traumatic occlusion.

Fig. 6—Traumatic necrosis of thirteen years' duration.

Fig. 7—Pyorrhea pocket formed by overhanging filling at cervical margin.

bridge was the only apparent cause for the cyst, the teeth never have been carious. A history of other trauma could not be elicited.

Case 5 (A386632), Mrs. H. W., aged twenty-seven years, had fallen down stairs and landed on her face thirteen years before. The lower anterior teeth were loosened by the fall, but soon tightened and appeared to give no further trouble. Full mouth roentgenograms revealed a large area of traumatic necrosis involving the bone around the lower centrals and laterals. (*Fig. 6*). This condition was no doubt the result of the accident and had influenced the patient's general health. She complained of severe frontal headache, earache, and discharge of pus from left ear. General examination revealed a positive Wassermann reaction.

An important factor in the prevention of pyorrhea is the early recognition of predisposing causes. Overhanging fillings, poorly-fitted crowns, and inlay attachments of bridge work which do not fit properly or which stress of mastication has caused to spread, cause irritation of the gums and furnish breeding places for bacteria. These conditions break down the resistance of the peridental tissues.

In the examination of 400 patients selected at random, 1872 fillings were found. Thirty-one per cent. had overhanging cervical margins, and 63 per cent. of these were definite pyorrhea pockets. There were 376 crowns, of which 52 per cent. fitted badly and had rough margins; and in less than 24 per cent. of these there were pyorrhea pockets. There were 249 bridges, and 44 per cent. were

defective; in 57 per cent. of these there was pyorrhea around the abutments. In these cases there was no other evidence of pyorrhetic involvement.

A great number of incipient cases of pyorrhea will not be discovered early except by routine full-mouth roentgenograms. *Figure 7* shows chronic irritation of the gums with subsequent destruction of the alveolar process. Pieces of misplaced and unnoticed filling material are other predisposing factors in periodental disease, as are many other foreign bodies, such as pieces of wooden tooth-picks, broken needles used in administration of local anesthetic, and fragments of various substances forced into wounds caused by accidents or explosions (*Figs. 8 and 9*). If routine full-mouth roentgen-ray

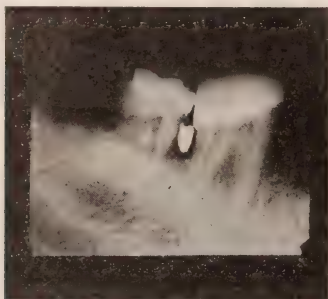


Fig. 8

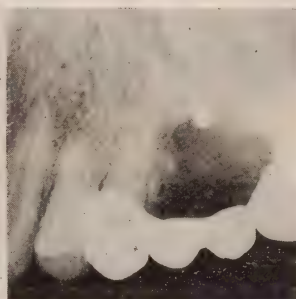


Fig. 9

Fig. 8—Result of misplaced filling material in interproximal space.
Fig. 9—Pieces of shrapnel remaining from war wound.

examinations of the mouth were made at intervals, such conditions could be corrected and future discomfort and disease prevented. It is important in diagnosing pyorrhea pockets by the roentgen-ray not to place too much confidence in this proof alone; exploration may be necessary, and it is necessary to distinguish between normal senile atrophy and involvement due to pyorrhea.

Roentgenograms reveal many hidden carious areas. Caries under crowns and fillings, along cervical margins, in proximal surfaces and in other out of the way places is not noticeable until it causes pain, or enamel caves in. An explorer or floss will generally pass over these areas in their incipency without obstruction. Only the roentgen-ray will reveal them before they can do a great amount of injury to the tooth.

Routine full-mouth roentgenograms are a necessity in the diagnosis of oral diseases, but should not comprise the entire examination. They should be checked and be corroborated by re-rays, palpation, exploration, electric sensitivity, and so forth.

LIVE A LITTLE LONGER—WATCH YOUR TEETH A DENTAL SURVEY*

BY EARL BROOKS, D.D.S., NOBLESVILLE, IND.

ACTING ON THE SUGGESTION of the president-elect of the Indiana State Dental Association during the year of 1920, the Board of Trustees considered favorably the idea of conducting a state-wide dental survey of all the school children of school age. From the results of this survey could be compiled scientific and educational data that would be a benefit to the profession of dentistry as well as to the public.

At a meeting held in the office of the State Superintendent of Public Instruction, Indianapolis, the superintendent of public instruction, the secretary of the State Board of Health, the state Red Cross officers and the State Dental Association officers considered the above survey. It was discovered that the suggested survey would require the examination of 656,604 children in the public schools system of the state. In addition it was estimated that the parochial schools over the state had an attendance of 40,000 or more, this making a total to be examined of 700,000.

Presuming that a dentist could examine one mouth every three minutes and with five school hours per day it would be possible to examine one hundred per day. In order for him to accomplish this he would have to have an assistant to make the charts as he made the examination. This average might seem low to some, but when you consider that the rural schools are widely separated and over roads that at times are almost impassable it is doubtful if this average could be maintained, taking the state as a whole. Figuring on this basis it would have taken seven thousand days to make the examination. Assuming that five hundred members of our profession would have devoted themselves to this task it would have taken fourteen days to have completed the task. The getting that number of dentists to spend that amount of time gratuitously, as you all know, would be questionable, and whatever proportion less responded would mean that much more time for those that did respond. Such a survey would have required much printing, also expressage to and from stations; besides the tabulating of results would have required the services of twenty-five clerks for ten weeks at a cost of at least two thousand dollars. The immensity of the task as well as the expense resulted in the conference abandoning the idea.

*Presented at the Indiana State Dental Society, May, 1922

As a substitute measure the following plan was agreed upon: The State Dental Association was to furnish the blanks and the rural health nurses with a simple chart would make the examination. During the fall of 1921 they examined 22,863 children. The results of this examination are as follows:

CHART NO. 1

	Boys	Girls	Total
Number examined.....	11,192	10,971	22,163
Number who use a tooth brush.....	4,278 38%	6,366 58%	10,644
Number who do not use a tooth brush.....	6,914 62%	4,605 42%	11,519
Number who have clean teeth.....	5,044 45%	6,654 60%	11,698
Number who have dirty teeth.....	6,148 55%	4,317 40%	10,465
Number having good occlusion.....	9,320 83%	9,298 84%	18,618
Number having bad occlusion.....	1,872 17%	1,673 16%	3,545
Number of broken down teeth.....	7,266	5,924	13,190
Number of cavities.....	20,622	18,909	39,531
Number of first molars decayed.....	8,452	8,396	16,848

We readily note that the girls are more careful of their tooth toilet than are the boys for 20% more girls use a tooth brush than do boys. As a result of the greater usage of a tooth brush the girls have on an average of 15% more clean teeth. In the matter of good occlusion the girls only exceed the boys by 1%. In the matter of broken down teeth, cavities and first permanent molars decayed you will note that the girls have a relatively lower number, but when you see some of the other charts one can readily see that this is due to having a higher percentage of clean teeth. The conclusion is that there is no material dental difference between the sexes, except in the use of the tooth brush and the relative influence that it has.

The totals are only interesting inasmuch as they are appalling in their immensity. One must take in consideration that the nurses making the examination probably only recorded the grosser cavities because they would not be expected to recognize pit and fissure cavities where an actual excavation did not exist and the actual number of cavities would no doubt be almost double this number, and prove that it is time some movement either educational or legislative to correct this health defect in our future citizens is necessary.

CHART NO. 2—USE OF TOOTH BRUSH

Number who use a tooth brush.....	10,644	Brush
Those using a brush whose teeth are clean.....	8,009 75%	clean
Those using a brush whose teeth are dirty.....	2,635 25%	dirty
Number who do not use a tooth brush.....	11,519	No brush
Those not using brush whose teeth are clean....	3,689 32%	clean
Those not using brush whose teeth are dirty....	7,830 68%	dirty

This table readily convinces one that brushing the teeth is advisable if one wants to have clean teeth, because 75% of those using a

brush have clean teeth while only 32% have clean teeth who do not brush them, and the advisability of having clean teeth is proven in tabulations that follow:

CHART NO. 3—CLEAN OR DIRTY TEETH

		Ave. Per Person	Excess in Dirty Mouths
Number who have clean teeth.....	11,698 Clean	...	..
Number who have good occlusion.....	10,304 88% good	...	..
Number who have bad occlusion.....	1,394 12% bad	...	..
Number of broken down teeth.....	5,399	.46	..
Number of cavities.....	18,058	1.54	..
Number of first permanent molars decayed.....	7,609	.65	..
Number who have dirty teeth.....	10,465 Dirty	...	..
Number who have good occlusion.....	8,314 80% good	...	..
Number who have bad occlusion.....	2,151 20% bad	...	..
Number of broken down teeth.....	7,791	.74	.28
Number of cavities.....	21,473	2.05	.51
Number of first permanent molars decayed.....	9,239	.88	.23

In the first place orthodontist claim that these totals are too low in the bad occlusion column. This tabulation being made by nurses the number probably represents the extreme cases. Note that those with clean teeth have 8% higher good occlusion than those with dirty teeth. This does not follow that the occlusion is affected by the cleanliness but rather the occlusion affects the cleanliness as we all know that regular teeth are more easily kept clean than those that are irregular.

You also note that those with dirty mouths have a higher percentage of broken down teeth, cavities and first permanent molars decayed than those with clean mouths.

CHART NO. 4—EFFECT OF OCCLUSION

		Average Per Person	Excess in Bad Occlusion
Number who have good occlusion.....	18,618	...	...
Broken down teeth in this class.....	9,911	.53	...
Number of cavities in this class.....	31,852	1.71	...
First permanent molars decayed in this class.....	13,316	.71	...
Number who have bad occlusion.....	3,545	...	...
Broken down teeth in this class.....	3,279	.92	.39 76%
Number of cavities in this class.....	7,679	2.16	.45 28%
First permanent molars decayed in this class.....	3,533	.99	.28 39%

This readily convinces one that a mouth with good occlusion is very much to be desired, inasmuch as it is less liable to dental defects.

By observing all these tables one is readily convinced that the use of a tooth brush is advisable, inasmuch as the chances for a

clean mouth are greater and a clean mouth is to be desired because a clean mouth is less liable to dental defects.

Isn't it time that the people of Indiana demand legislation that will make available proper care of their children's teeth, thereby safeguarding their future health?

THE DENTAL HYGIENIST*

BY MILDRED M. GILSDORF, CHILLICOTHE, O.

IT IS VERY PLEASING to seem to meet with your approval. I agree with Dr. Stevenson, of New York when he says that dentistry has reached the most critical period in all its history. That time is critical because the science of dentistry, like that of medicine, has reached the point where preventive measures are as much if not more in demand than curative measures.

The introduction of the dental hygienist into the field of dentistry has made it possible for the dentist to meet the demand of the public for these preventive measures. It would be impossible to add to or enlarge upon anything that has been said this evening as to the dental hygienist, her field of operations, her limitations or her service to the public, and we will just make things a trifle more realistic by giving you a short lecture such as might be given to school children of the fifth grade, ranging from the ages of ten to eleven. There may be some people here who have reached the age of second childhood, although we may not care to admit it. (*Laughter*). But if I ask you any questions, please answer them as you would if you were a pupil in the fifth grade at school.

Good afternoon, boys and girls. I am very glad to be here this afternoon. Your teacher has told you that I am a dental hygienist. A hygienist is one who cares for the general health of a person, an institution or a community. A dental hygienist is one who cares for the cleanliness and the health of the mouth. I am a dental hygienist, and am going to talk to you this afternoon about your teeth.

Let us start right back in the very beginning. Do you know how many sets of teeth you have? We have two sets of teeth. The first one is known as the deciduous, sometimes we call them temporary teeth, and probably you have heard them called baby teeth. The second set are the permanent teeth. The deciduous or baby teeth are twenty in number, just as many as you have fingers and toes, ten on the upper and ten on the lower jaw. The deciduous teeth start to come in when we are just a few months old, and

*Report of a talk before The Ohio State Dental Society, December, 1921.

when we reach the age of about two years we have about all of these teeth.

Next come the permanent teeth, the teeth we carry with us all through life. Of them we have thirty-two, just twelve more permanent than we have deciduous teeth. The permanent teeth start to come in when we are about six years old. Have you ever heard of the six-year molar, the first molar? We will call it the first molar. This tooth comes through when we are six years old, and it is very liable to decay because mother oftentimes thinks that it is just a baby tooth, and that it will come out anyway and that she won't pay much attention to it. But if you have any little brothers and sisters at home, go home and tell mother that tooth is a second tooth and not a first tooth and that she must take care of it, because when that tooth is lost, the other teeth will gradually lean over and fill up that space, and that jaw will be that much smaller on that side, and that is one of the reasons we see people with such crooked teeth, and no one likes to see crooked teeth.

Boys and girls, did you ever think of your mouth as a piece of machinery, something which takes fuel to run it? If an engine is given fuel it goes around, and it says, "choo, choo, choo." Isn't it the same thing in your mouth, when we put food in it, "chew, chew, chew?" (*Laughter*).

The railroads employ section men. They go in three groups. The first go around about the tracks and take out the weeds. The second group follows up and takes out the weeds the first group does not see, and they look around for faults in the track, something that may be serious. Then the third group comes along and they repair the places the second group has reported. Why do the railroads employ these men? They employ them to look after these tracks to avoid a wreck. We are going to be track walkers in our own mouths. You are going to be the first group. You are going to weed out these tracks, your teeth we mean, by brushing them every day after each meal and before you go to bed at night. I am going to be the second track walker. I am going to follow up your work and clean and polish your teeth in places you cannot reach with your tooth brush, and look for cavities, or, as you call them, holes, and if there are any cavities there I am going to report them to your dentist. The dentist is going to be the third track walker. He is going to follow up my work, and is going to see that those teeth are filled and taken care of.

Why are we doing that, boys and girls? Isn't it to prevent you from being a wreck in life? We want you to be strong men and women, and to enjoy life, and not go around with such diseases as rheumatism and nervousness and tonsilitis, which you have all had. Sometimes that is due to an unclean mouth, and we want you to avoid those things. I want to give you this little rhyme:

Brush them clean, brush them right,
 Brush them well, every night,
 and I know you will get along much better in your work.

Just remember you are going to be a track walker in your own mouth, and you will see that you can take care of your mouth as well as some of the dentists. Just remember that you are not going to forget to brush your teeth every day. Take it home to your brothers and sisters and to mother, and see if we cannot grow up a strong generation of young men and women. I thank you. (*Applause.*)

AROUND THE TABLE WITH THE NORTH CENTRAL OHIO

On July 19, the North Central Ohio held a picnic meeting at the Norwalk Country Club, a very interesting feature of which to me at least, was a round-table discussion of several topics connected with every-day practice, particularly one, in answer to a question by Dr. T. S. Seeley, of Norwalk—"What, in your Practice, have been the things most satisfying?"

To this question a few answers have been received and are printed below.

The one thing that has given me more satisfaction than any other is the results I have been able to obtain from a diagnostic standpoint with my X-ray work. Often a case presents, giving a history of failing health for the past five or six years, the treatments and medicines taken without effect. When I can find one or more badly-infected teeth in such a patient's mouth and by their treatment or removal restore such patient to good health and comfort, I cannot but feel a great source of satisfaction. I can give positive evidence that by my X-ray findings and the subsequent treatment, I have improved some of my patients in health and comfort, restored some to good health, and in one particular case saved a life.

Norwalk, Ohio.

D. W. Stoup, D.D.S.

The one thing that pleases me most is when a youngster, about three years old, comes into my office with its mother for dental services due to decay, and I can straighten out the mother's mind in regard to the diet of the child and induce her to feed the child the right foods that really nourish the cells of the body so when the child grows up it will have a strong healthy body, good teeth and will not be handicapped in the world by healthy people. The thing I am sorry about most is, that I can't talk to that same mother when pregnancy starts and tell her what to eat to help herself and the child.

Sandusky, Ohio.

L. F. Meyer, D.D.S.

My greatest pleasure is in knowing that when a subject's physical condition is suffering from conditions that the teeth are at least in part responsible for, that I can render a service that they can appreciate as a benefit to them. And it is a continual delight to afford myself every opportunity to increase my efficiency.

Gibsonburg, Ohio.

P. A. Gould, D.D.S.

To find gold fillings made of malletted foil still preserving teeth after forty years, is one of the most satisfactory things in my practice.

Sandusky, Ohio

C. D. Peck, D.D.S.

The thing most satisfactory to me in practice, is upon treating children from six to ten years old, for the first time is to so instruct them as to the care of their teeth, in order to avoid future destruction of tooth structure. In doing so I feel I am rendering a service to a patient that will carry on for a lifetime.

F. N. Seeley, D.D.S.

In answer to the question: "What in my practice have been the things most satisfying," the first thought suggests "money," a very necessary part in life, but superficial, as I see it; for the part that is really satisfactory is a valuable service that brings a response of approval. When the money question comes first it would seem inductive of a troubled conscience.

T. S. Seeley, D.D.S.

I derive the greatest satisfaction in my practice from two things: restoring my patients' mouths, whether by bridge or denture service, so that they can better masticate their food, thus enabling them to more nearly derive the amount of nutrition from their food that nature intended; and secondly, from informing them where such a condition obtains, whether they act upon the advice or not, of the possible danger that lurks in infection, explaining how and why such a condition occurs and how it should be taken care of. In other words, in giving real health service lies my greatest satisfaction.

Fremont, Ohio.

A. G. Thatcher, D.D.S.

In reply to the question: "What in my practice has probably given me the most satisfaction?" I think I would say that:

"The smile upon the face of a little patient upon leaving the office, a "symbol of confidence" in one, after one had performed a real service. Contrary to expectations as you had seen that little one enter your office, tears streaming down his face, due not only to pain, but to the tales of playmates, and inherent fear as carried to them by their parents in the light of "old dentistry."

That 'symbol of confidence' in the dentist has meant much, as shown by later cooperation, the child ever being open to suggestions as to best care of the teeth in relation to future health and happiness.

Bellevue, Ohio.

R. E. Woleslagel, D.D.S.

I have held these answers nearly two months, hoping to receive more of them, but am finally printing those received, rather than wait longer for messages that may never come.

It seems to me that the Round Table method of study and mutual help is a most excellent one, and I hope to see it more generally employed—and by the way, why not send to me, Mr. Reader, *your* answer to the question given above?—"What has been most satisfying to *you* in the practice of dentistry?"

—G. E. H.

DENTAL LEGISLATION

BY ALPHONSO IRWIN, D.D.S., CAMDEN, N. J.

(Written for THE DENTAL SUMMARY)

A SHORT REFERENCE to general legislation will clarify the present-day conditions underlying dental legislation. It will likewise account for the volume, lack of poise and instability of law-making. Twentieth century legislation has been subjected to the fiery tests of war, famine and pestilence—the most severe in the world's history. Legislation has lost its equipoise, agitation runs riot; revolution has supplanted evolution in law-making.

These tests have over-stimulated legislation in many countries. In fact over-production in law-making is the most striking feature of the first quarter in this century. War stimulates military legislation. Famine compels conservation, while pestilence forces sanitation. Carry the analysis far enough and we have oral hygiene and police regulations which include the subjects of dental legislation and dental laws.

AN ORGY OF LEGISLATION

Some nations are staggering under a burden of (1) Undigested Laws, yet strange to say, like *Oliver Twist*, they are crying for "more." Other nations are demoralized because of the (2) Lawlessness, non-enforcement of time-tried and established acts of legislation, while a third class of nations are suffering from (3) Legislative Paralysis.

UNDIGESTED LAWS

1. Under the first classification may be named the United States of America. The republic founded for the purpose of escaping monarchical legislation and giving the people a chance to make their own laws has reacted to world conditions in an astonishing manner. The phrensy for law-making was pronounced in past years. A conservative estimate would indicate that a hundred thousand legislative *Bills* have clogged the calendars of over fifty legislatures, while the annual output of laws by legislatures and congress is said to number over twelve thousand. Congressional legislation affects every conceivable form of business as well as every subject of activity and object of living. Consequently extremists have suggested that it would be a good idea for congress to adjourn for ten years. We do not think so. Taken as a whole, congressmen are doing the best they can under conflicting and baffling conditions. The 1922 Congress has succeeded in reducing the number of Bills upon its calendar to 981 plus and only 431 plus have been passed. Conditions are so com-

plicated and unusual that they stagger the keenest minds. Time and the most astute statesmen only can adjust legislation with any degree of equity. The effect of National upon Dental legislation has been wide and potential. It has given dental law-making the most powerful impetus of the age. It has set the pace, established standards and dared Dental Legislation to follow. Out of this super-abundance of legislation the best acts must be sifted and retained.

LAWLESSNESS

2. If we look abroad for illumination, we find that Russia is the most familiar example of the non-enforcement type. Despotism has been overthrown and revolution has succeeded revolution. Lawlessness is frequent and flagrant, but we do not have to go so far away. There are some neighbors on the American continents who are famous for turbulence. Their open hostility to, and disregard for legislation, both foreign and native, is so apparent and well known that it is unnecessary to name any one of them.

The effect of non-enforcement of laws is waste, want, lax morals, defective service, fraud, oppression, dissatisfaction, professional degeneracy in a commonwealth. Non-enforcement of dental legislation is almost as fatal as legislative paralysis.

LEGISLATIVE PARALYSIS

3. We find in China the most noticeable illustration of legislative paralysis. "China has no time for laws, legislation or lawyers." We quote directly from one of China's highly cultured and eminent statesmen, a graduate of Yale and other universities. Consequently China has no dental legislation and the ideas about dentistry are the crudest and most absurd of any hitherto made known.

These three factors we have named, namely, War, Famine, Pestilence, culminating in a glut of legislation upon the one hand, or lawlessness and non-enforcement of legislation upon the other, or, legislative paralysis in some countries, have been powerful agencies in revolutionizing existing twentieth century conditions and shaping the era we have entered upon. They are only three of many factors but they serve to mark the trend of general and special legislation. The sway of despotism marks the *Stone Age* of legislation, legislators who were stone deaf to the rights of individuals and eighty per cent. of the people were slaves. The common people have come into their own. Law-making for the exclusive benefit of autocrats has been given its death blow.

The irresistible demand for a republican form of government, the universal trust to legislation enacted by delegates elected by the people to represent them in conducting the business of state and law-making, the adoption for human government of Lincoln's famous postulate, "A government of the people, by the people and for the people", are all familiar indications of what kind of legislation we are going to have in the future. Therefore the kind of dental

legislation we must expect is, "of the people, by the people and for the people". If it suits the people concerned, the credit belongs to the people; if it does not promote the general welfare of the people, it is their own fault, and the power to rectify it lies in their hands by the ballot.

SCHOOLMASTERS

If dentists are dissatisfied with the conditions imposed upon them by legislation they need to remember that legislators are our schoolmasters and we must obey them however irksome the task they set before us; but the remedy is in the hands of the practitioners of dentistry as well as the people, and they have the privilege of electing law-makers who will legislate in accordance with just demands made upon them. Dentists help to elect the schoolmasters, they delegate them as their representatives to enact laws. In other words they can make or unmake existing dental statutes if they are not legislated for the good of the dentist or the public.

BOOMERANGS

It should be clearly understood at the outset that the legislation regulating the professions is conceived by the members composing such profession. Therefore the product of dental legislation is the handiwork of the dentists themselves, instigated primarily by the profession, formulated by dentists elected and appointed for that very purpose because of their special fitness for such work, and the bills drafted in consequence consist of their own ideas and reflect the spirit of dentists themselves. If dentists criticise dental legislation they are judging their own acts, disclosing their own motives in advocating such enactments and revealing their inmost selves. This thought should be kept in mind when anyone is tempted to express hasty, ill-timed, and immature opinions upon this subject. It also should be remembered that the welfare of the dentist himself is considered primarily, and that the general welfare of the commonwealth is secondary in the minds of the drafters of dental bills for legislation, so that dental legislation is not by any means the philanthropic proposition that some persons try to make it out to be. In protecting himself the dentist is also compelled to protect the public by legal means, so that the less a dentist says in adverse criticism about dental statutes the better it will be for him and his cause. *Unjust* criticism is a boomerang that hurts the critic worse than the object criticised.

But legislative boomerangs apply to civil authorities and civilians as well as dentists. They are all responsible for saying many things that had better be left unsaid, and doing many things that had better have been undone, in the conflict for mastery by conflicting interest.

MEMORANDUM

From the Division of Bibliography

September 8, 1922

We find that it is impossible to give the exact figures for the year 1921-1922. The sessions of Congress are entirely independent of the calendar or fiscal year and we therefore give the following table:

DISPOSITION OF BILLS AND JOINT RESOLUTIONS
66th and 67th Congresses

66TH CONGRESS	INTRODUCED			PLACED ON CALENDAR			ENACTED INTO LAW
	HOUSE	SENATE	TOTAL	HOUSE	SENATE	TOTAL	
First Session (May 19—Nov. 19, 1919)	10984	3584	14568	368	309*	677	122
Second Session (Dec. 1, 1919— June 5, 1920)	3857	1137	4994	490	354*	844	292
Third Session (Dec. 6, 1920— Mar. 4, 1921)	1810	595	2405	237	166*	403	181
Total	16651	5316	21967	1095	829*	1924	595
67TH CONGRESS							
First Session (April 11, 1921— Nov. 23, 1921)	9509	2910	12419	495	327	822	151
Second Session (Dec. 5, 1921— Sept. 6, 1922)	3432	1315	4747	498	564	1062	304
Total	12941	4225	17166	993	891	1884	455

Signed by H. H. B. Meyer,
Chief Bibliographer.

Sept. 11th, 1922

EDITOR THE DENTAL SUMMARY:

I am obliged to request you to publish the enclosed table as supplemental to my article upon Dental legislation for THE DENTAL SUMMARY.

The information was sent for months ago and just arrived from Washington. It is of a character that is of widespread interest to the press and country at large and especially to the State of Ohio, because it throws light upon a hitherto mooted point and vindicates the 1921-22 U. S. A. Congress.

It possesses the merit of being fresh and the press does not yet appear to have caught on to the facts, so that the DENTAL SUMMARY will have that credit.

The manner and time of securing these facts illustrate the difficulty and delay in procuring official data and the tenacity with which investigations in all directions must be pursued. The table also proves how the subject may be misrepresented. Regretting the necessity which compels me to trespass upon your valuable time, I am,

Yours very truly,
A. Irwin, D.D.S.

HOW THE INDIANAPOLIS DENTAL CREDIT BUREAU WORKS

BY ROBERT WHITE BLAKE, D. D. S., INDIANAPOLIS, IND.

(Courtesy of the Author and the Publishers of Oral Hygiene)

I WILL TRY TO TELL YOU a little of the workings of the Indianapolis Dental Credit Bureau and what it is doing for all of us who have taken advantage of its protection.

As long as I have been practicing dentistry there has not been any way in which we could really get a mental picture of the attitude of our new patients regarding dental service and their appreciation of it. When a new patient presents himself we have no way of knowing whether he left his former dentist because he was urged to pay a just bill or for a personal reason.

I have for years wanted a plan worked out so that when a new patient came to me I could call a central office and find out if the patient had a history record on file, and by thus obtaining this information I could be protected in my dealings with him. Many of the boys to whom I have talked from time to time wanted such an organization, but their ideas were never put into practical use.

Something, a still small voice, I guess, kept telling me to go ahead and start such a movement, until I had to present the matter to my dental friends.

I called about fifteen of the fellows together one noon in September, and at that luncheon I presented my idea in concrete form. I had the backing of the boys present at that meeting to "go to it."

That was all I needed. I believed in this proposition, and, with the support of the few fellows, I knew that its success was assured from the start.

So I began the actual working of the Bureau—our own Dental Credit Bureau—somewhat in the following manner:

First, we secured desk room in the Hume-Mansur Building with the use of a telephone. Then we obtained a competent girl who is not only a notary, but an experienced book-keeper. We figured the dues for a year at \$1.00 a month and we believed that we could get enough fellows to join at \$12.00 a year to pay the actual expenses.

In passing I might say that all bills have been paid, we still have money in the bank, and we are adding one or two new members each day. We pay the young lady \$50.00 a month; she handles all the office work. I simply give advice and sign the checks.

When a dentist comes in as member, he fills out an application card with his name, location and telephone number. He agrees to abide by the rules of the Bureau, as formulated from time to time. He mails his check with his application card, together with a list of all the undesirable patients with whom he has had dealings. This list dates back two years at least.

With each patient's name a brief financial history is given.

Upon receipt of the card and check the girl mails the new member a receipt for dues and gives him his code number, which was first written on his application card in her files.

That code number is given each dentist to verify his call over the phone.

As an example: a new patient comes in and at an opportune moment I call the Bureau. After I tell the girl who is speaking she asks me for my code number.

If it is the same as that written by her on my application card which she has before her, she will give me what information has been reported about this patient.

Absolutely no information is given out unless the code number agrees with the name of the dentist given over the phone.

You will please bear in mind that we keep on file only the names of those patients who are undesirable.

But what a lot of them we have already! All classes of people are listed—some among prominent families. Three members have reported the same patient. You can just see in your mind's eye that person floating around the city, getting service, with no intent to pay.

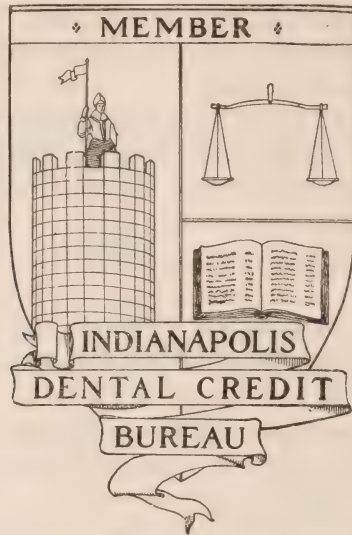
At least, he has not paid these three dentists, and I happen to know that the services rendered were of high grade.

But the Bureau has his record on file and when he wants any more dental work done he will have to go to some dentist who is not a member of the Bureau—and may the Lord help the unfortunate dentist! This fellow is as smooth as silk, a nice fellow personally, but he has no conscience when it comes to paying dental bills. The collecting agencies can do nothing with him, and the efforts of the lawyers to collect from him are a joke.

We have over five hundred names on file already. Think of the protection we have by knowing these people, and what it will mean in the future. It certainly will eliminate our dead accounts and permit us to give our best service, knowing that we will get our money. When we do charity, it is charity; but what hurts is to lose

our supposedly good accounts after hours of hard work at the chair.

Our Bureau files the names of the patients and the history as reported by the individual dentists. Only the code number of the dentist reporting is shown on the card, not his name. This is to protect the dentist should the card be lost or come into the hands of outsiders.



This insignia hangs by the chair of each member.

Each dentist member is presented with the insignia of our Bureau. It is, we think, very attractive and speaks for itself. I am glad to state that the boys are hanging it by their chairs. That is the place for it. The figure on the watch-tower represents the dentist on the lookout for undesirable patients; the scales to the right of the figure are the scales of Justice; the open book below contains the records.

With little mental effort the patient in the chair can understand the meaning of the insignia. It immediately makes an impression.

He will see to it that his name is not handed in to the Bureau as slow pay or otherwise. He will pay his account promptly.

One or two of the dentists have told me that they did not need the Bureau, for they did only cash business. I tried to explain to them that was only half of their obligation.

I told them that many times when a patient came to their office, by calling the Bureau and learning of some crooked deal he had put over on a dental friend of theirs, they undoubtedly would refuse to do that patient's work at any fees, if they really considered their fellow dentists. I know that here in Indianapolis we have a loyal bunch of

dentists, with a wonderful spirit of brotherly love, and this co-operation is sure to draw us closer together from day to day.

Each member of the Bureau has a rubber stamp which prints as follows: "MEMBER INDIANAPOLIS DENTAL CREDIT BUREAU." This is used on statements addressed to patients who are classed "slow pay." Some of the boys have told me that that stamp has brought in money in some cases where the account was over a year old. Most people cannot stand to have their name on a black list of any kind.

Only yesterday an orthodontist, who came into the Bureau merely to support it, as he told me, received a check for an account which was over a year old. His assistant used the stamp upon the statement which was mailed to the patient.

The Bureau has ordered seals made bearing the same words as the stamp; and as soon as they are received each member of the Bureau will be sent a quantity for use.

I hope that I may have covered the subject so that the boys throughout the country may get an idea of how our Bureau is being operated.

Possibly this movement can be nationalized some day, and thus we can be protected from the moving population of dead-heads.

People are leaving our cities each month. Their record at the Bureau, if they have been reported, stays behind them and could be wired for your protection in the city where they will have made their new home.

If it will work successfully here, *and it does*, it will do the same in every city throughout the land. It is simply up to a few live fellows to start the movement in other cities, and I am sure they can obtain the necessary information in regard to the operation of such a Bureau by communicating with the Indianapolis Dental Credit Bureau.

The following recently appeared in the *Indiana Daily Times*.

"Associations of credit men have become an important factor in the commercial life of every city and each firm of any size has its credit man who confers with his colleagues at stated intervals, exchanging data for the mutual benefit of the members. Credit business is conducted upon the promise-to-pay theory, and as the majority of persons are honest, the merchant or manufacturer usually is perfectly willing to extend credits over various periods of time. The slow-pays and the deadbeats are in a minority, but since they exist in every community the credit men must be on the lookout for them and if victimized must inform other members of the association that they may be spared a similar fate.

"Credit men's organizations heretofore have been confined almost entirely to business circles, the professional men refraining from any concerted attempt to regulate their financial dealings. From one

very nature of their work the need for such an arrangement has not appealed to them. Usually the number of clients or patients is relatively small and personal acquaintance plays a more prominent part than in the relationship between the head of a store, for example, and the individual customer. The doctor and the dentist have a small percentage of transient trade but the majority of people who reside in a city select a certain member of each profession and continue to depend upon him so long as his ministrations prove satisfactory.

"The methods of most doctors and dentists in making collections would not be indorsed by business firms. Each depends almost entirely upon the pleasure of the patient for a settlement of an account, and many of them in any city could doubtless afford Southern cruises this winter financed entirely on outstanding accounts. A number of local dentists have undertaken to improve conditions by organizing the Indianapolis Dental Credit Bureau. Nominal dues will enable the Bureau to push collections and to notify members of prospective patients who have the reputation of forgetting to pay their bills. If a deadbeat's molar goes on a rampage Bureau members will refuse to relieve the pain until moldy bills are paid. If the method succeeds the doctor, co-sufferer with the dentist for man's procrastination, may think seriously about organizing a Medical Credit Bureau."

A METHOD OF REFITTING MISFIT UPPER DENTURE*

BY H. S. BARRICK, NEWARK, OHIO

THIS IS AN APPLICATION of Dr. Dayton Dunbar Campbell's method of post-damming in refitting a recently made misfit upper plate. Cut a groove around the periphery of your plate on the palatine surface about a quarter of an inch wide, with an ordinary "heatless" stone. Take a little strip of carding wax, or the ordinary wax that teeth come on, and place it in this groove and heat it to about body temperature and press the plate firmly into the patient's mouth, using force. Remove from patient's mouth, trim off any excess that might occur on both labial and palatine sides. I usually use a vulcanite scraper for trimming on palatine surface up to the inner shoulder of the groove. Then return to patient's mouth, directing her to close her teeth firmly for about five minutes, and by moving the lips and cheek muscle-trim the wax. Remove, chill, and flask, teeth down. Pour palatine surface of plate to inner edge of wax rim; soap or shellac, as you may wish. Pour the second part of flask. After it is set, separate, scald out wax, pack narrow piece of vulcanite in groove. Close flask, being sure to separate, remove all surplus vulcanite, and vulcanize.

*Given as a Clinic Ohio State Dental Society, Dec., 1921.

PENETOLOGY

Conducted by WILLIAM A. LURIE, M. D.
1130 MAISON BLANCHE BUILDING
NEW ORLEANS, LA.

This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

In previous papers the study of conditions portrayed by the peneto-ray and expressed in terms of penetration value equal to Grade 3 and Grades 2a and 2b was undertaken. There now remains the discussion of the reading of shadow of Grade 1.

Grade 1 shadow is that which indicates soft tissue. It is that registration in shadow value which indicates tissue without a proportion of mineral content sufficient to cause a resistance to penetration as great as bone or minerals themselves. This tissue is found about the mouth as the gingiva, the peridental membrane and the soft tissue in the spaces of alveolar bone or Haversian canals as well as in foramina and canals which are the exits and channels for blood vessels and nerve tissue. Grade 1 shadow is difficult of definition in the penetogram. It is still more difficult of portrayal on an electrotpe reproduction. However the attempt is here made and it is hoped that the explanation and picturing will prove clear enough to be understood.

In illustration A, which has been printed a little darker than necessary so that the detail could be emphasized if possible, the bone shadow of Grade 2a is distinctly outlined and differentiated from the area neighboring it. Just above the border of this bone shadow for about three thirty-seconds of an inch and following closely the bone outline it will be noted that there is a distinct line of a slightly deeper color than that still further above, yet not as dense in color as that below. This variation in color is an index of the difference in variation which exists in the density of the tissue on either side of this area. Above there was nothing but buccal tissue to penetrate, while below this line there was alveolar bone. This area represents the gingiva. A little to the right of the middle of this picture it will be noted that the upper border of the alveolar shadow, (Grade 2a) is irregular, rises slightly and then is interrupted by a shadow of a different grade. The gingival shadow rises at this point to cover what can be seen as an elevation over shadow of Grade 2a.

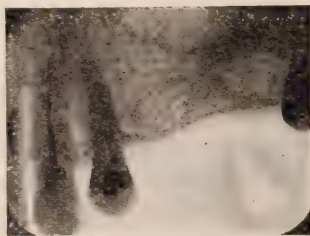
In explanation of this condition and in the reading of a penetogram of such an area, the edentulous jaw should picture a distinct

and uninterrupted demarcation between Grade 2a shadow and Grade 1. At the point to the right of the center which is being explained, the irregularity or difference to be noted is in a round mass, distinctly indicated and separated from both bone and soft tissue. On close study it may be noted that Grade 1 shadow can be made out over the round mass and a line of separation below it, indicating where it rests on the alveolar bone. The penetrogram in this instance disclosed a piece of tooth root covered by gingival tissue and the cause of the pain the patient suffered when attempting to wear a denture.

Fig. 1



A



B



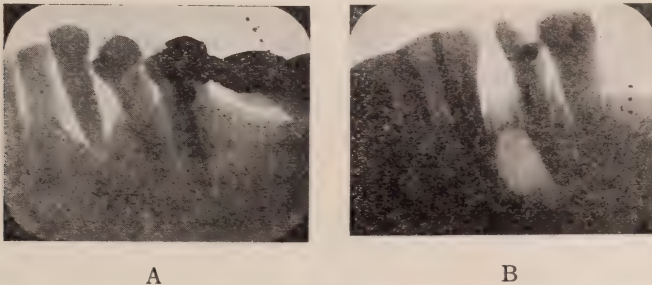
C

Comparison is now directed to B and C of *Figure 1*. In B between the bicuspid (premolar) and the molar pictured it will be noted that there is a distinct line of demarcation between the alveolar process and gingival shadow. This line is smooth and regular and even in its apparent density. The line of gingival tissue can also be distinctly followed about one-sixteenth of an inch below that of the alveolus. At the point just distal to the premolar it appears slightly thicker, perhaps due to the slight amount of alveolar absorption which can be noted about the premolar. However the outstanding feature of the difference between the healing of alveolar process as seen in B and C of *Fig. 1* and appearance of gingival tissue expressed as shadow of Grade 1, is the fact that in B, it is distinctly visible and the line of demarcation between alveolus and gingiva is sharp, well-defined and distinct, while in C there is no

line which denotes the termination of one tissue or the beginning of the other.

It is interesting to note that clinically the case pictured as B gave no symptoms of any nature, referable to the mouth, while in the instance of C the patient has symptoms of a low-grade chronic infection. It is possible that the absorption by way of the alveolar process which is unhealed or rather not covered with periostium is more rapid, more easily possible than by way of the alveolus which is protected. The penetogram properly read discloses this difference. The fact of the proper reading of the picture with the interpretation of the proper extent of tissue of each class and shadow of each grade is the only key to a correct diagnosis and is here emphasized. The fact of the presence or absence of a delicate membrane is established by the penetogram yet that membrane itself cannot be pictured. Dependence must not always be laid on what is pictured, but what can be explained beyond the pictured relation of densities.

Fig. 2



In the above illustration we have the picturing of Grade 1 shadow in unusual position and extent. In A it is seen as an extension downward from its normal position while in B, Grade 1 shadow can be seen distinctly isolated from the gingival margin or from any connection with it. In both cases this grade of shadow can be noted to extend well to and about the apex of the teeth involved, yet the nature of these conditions is vastly different. A represents a pyorrhetic process which found its origin on the surface and continued to progress through the advance of the destruction along the periodontal membranes apically. In B the process shows no connection externally, and more than likely being an extension of a process each formed about the periapical membranes, or even found its origin in the death of the pulp of the lateral. In A the hopeless condition of the tooth can at once be determined and the clinical history of the case pointed to an advanced pyorrhetic condition, whereas in B there was a discharging sinus in the position between the central and lateral incisors, with a marked tenderness over the central. Clinically one would have been led to believe in the case of B, that

the central was the involved tooth. The picture disclosed the site of the trouble, also its character and established the hopelessness of the directing of any form of treatment other than removal.

Again your attention is called to the importance of the proper interpretation of the penetogram, and to the fact that an interpretation based on grades of shadow and the knowledge of where each grade exists normally and what its normal extent should be is the more correct manner of making such determinations. It is also a method by which comparisons can be made and the decision of form and extent of treatment determined upon.

This method of diagnosis of the dental penetogram was not determined from an indifferent examination of a few pictures, but developed from the study of a large number of pictures carefully classified. To either prove or disprove these findings THE DENTAL SUMMARY will shortly undertake a classification of the findings of a great number of observers under a variety of conditions. This study and classification will also include an attempt to determine with what degree of regularity findings which now seem unusual or perhaps accidental, really do take place. It is hoped that from an extensive study and classification such as this will be, that more light will be shed on this important diagnostic factor of conditions about the mouth. It also will be proven that some conditions thought rare, are common and *vice versa*. Your assistance in this direction is requested. You will be given an opportunity to assist in this great work. Your part will be simple. If you care to assist will you kindly signify your intention of so doing, to this department or directly to Dr. Lurie, offering suggestions if you have any; they will be gladly acted upon.

PENETOIZED PARAGRAPHS

The earth is millions of years old if we believe the writings of our historians and scientific research workers, yet man and his presence thereon can be traced but a few thousand years. A small item of time in the calculations of this world's time, yet no man has lived to record or even make record of the effects and influences of one era upon the other. In this day and era of man we are without tails. We are told that our forefathers carried a caudal appendage. No doubt there were still other changes not so conspicuously recorded. We of the scientific world study the skull of ancient man, its shape and size, and its complement and arrangement and position of teeth. In our investigations of the origin of man we go even further. We try to fathom the diseases and diseased conditions which early man suffered. Skulls are dissected. Jaw bones are separated. Their internal construction is studied and compared with that of man of today. These studies have been prosecuted by the early men of this era as well as men of today. What is

the good of it all? is a question. Man lives—he lives as long—perhaps not as long in this century as he did in those of early record. Has our increasing knowledge—our discovery of how the early man lived, what he did and how he looked,—helped us to a longer life?

Many influences alter the span of the life of man,—we are told. They alter his appearance. They change his occupation. Each in turn, of all of these changes, has its effect—though imperceptible—still effective and constant. The unearthing of the jaw-bone of a pre-historic man may picture to the discoverer a bone condition very unlike that of man of today, and he may comment on the differences he finds as man's retrogression or his greater advance. Who is there who can dispute that the physical change in appearance is all the changes that have taken place? It is possible for the internal structure of bone,—the jaw-bone in particular—with its complement of teeth, to undergo a change in petrifying other than an equal advance of the process. And petrification takes a long time and all tissues do not lend themselves to this process equally. As the trees of old changed to coal and some perhaps to other forms of carbon—the diamond—gases were liberated and oils extracted. In the reduction of man and beast to the carbon state or to the petrified mummy state, gases form and oils disappear. Who can say that internally—within the outer crust of bone—now stone—such changes caused the alteration of bone from a spongy type to a compact or dense type or even *vica versa*? The study, therefore, of only a few of the skulls or bones of pre-historic man can be considered authentic, and only a few there are, to make up the average.

Scientific conclusions are based on the average of large numbers of findings; on the observation of results in a great number of cases under similar conditions, not on a few observations at random. The scientific medical world has at its command today the most accurate means of recording conditions in a vast number of cases, and all existing conditions. It is *not* taking advantage of this opportunity. THE DENTAL SUMMARY is going to *take the lead* in the attempt to gather statistics over a wide field, so that from a large number of cases under a variety of living conditions and from various climates, any variation which may be considered as indicative of a change taking place in the human jaw can be checked over a number of instances rather than by one case. The penetogram is to be the means of this great work of research and record, and the rank and file—every scientific person in a position to help—will be given the opportunity to do so. *But*—those who have access to an X-ray machine or who make more constant use of one, can lend the greatest assistance: Once the proper assistance is given in the collection

of the details for these statistics, a valuable idea can be had and authoritative data on the ratio of the appearance of changes as they are discovered can be determined. This day and era of science will not have to wait for the coming generations to discover what changes in teeth are taking place nor what might take place. We of the present era will be in position to know and to know definitely what is taking place.

THE KRONPRINZ WILHELM "POISON SQUAD"

The Kronprinz Wilhelm, converted German cruiser, left Hoboken August 3, 1914, and roamed the seas for 255 days, subsisting upon supplies taken from British and French merchantmen before she sent them to the bottom.

During this time she touched at no port, depending entirely for coal and provisions upon her raiding ability and her speed in escaping from her enemies' warships bent upon her destruction.

She was fairly busy during these 255 days. She sank fourteen steamers and seized vast supplies of fine white American and Argentina flour, millions of pounds of the finest of fresh beef—enough to give every one of her crew of five hundred men three pounds every day for a year—a considerable quantity of fresh pork, hams and bacon, potatoes, canned vegetables, dried peas and beans, sugar cakes, coffee, sugar and condensed milk.

In January the increasing pallor of the members of her crew was noticed by the chief surgeon, also the dilation of the pupils of their eyes and marked shortness of breath; but these symptoms were not considered significant, nor did anybody dream of connecting them in any way with the high-grade diet upon which the men were living, being in every way equal to that eaten daily by the "best people" of the United States; and the men went merrily along, drawing their typical American meals of fresh beef, with occasional rations of ham and bacon, potatoes, canned vegetables cooked in the juices that stood in the can, cheese, fine white bread, oleomargarine, coffee, tea, condensed milk and fine granulated sugar, three times every day, with sugar cakes, champagne and beer thrown in between meals.

In February the Kronprinz Wilhelm sank a steamer loaded with a cargo of wheat—whole, unground wheat. The germ and bran of that wheat would have been worth more to the rapidly succumbing Germans than its weight in precious stones, but they did not know that they were sick, nor how badly they needed that whole wheat, with its alkaline calcium and potassium salts. Almost every week they added to their store of red meats, potatoes, canned vegetables and oleomargarine. But little fruit was found upon any of the destroyed vessels, not more than enough to last the crew one day; so that was confined to the officers' mess; and, be it noted, none of the officers came down with the disease that followed.

Also, in February, many of the crew complained of swollen ankles, pain in legs and arms. But they continued eating freely of the refined foods of high caloric value, now so extensively relied upon throughout the United States.

In March alarming conditions developed; symptoms of paralysis, dilated heart, atrophy of muscles, and pain on pressure over nerves, with anemia and constipation were marked. Fifty of the men could not stand, and they were dropping at the average rate of two a day.

On April 11, 1915, she made a dash into the James river, and anchored off Newport News, a floating hospital, with 500 sick men on board, 110 of them in sick-bay, and the rest coming down at the rate of four every day.

A conference of the most famous physicians in New York was called, but they could not agree as to the nature of the malady, much less its cause and remedy. Finally a noted dietitian managed to get aboard—and then the trouble was met and conquered. Had those men been taken to a hospital ashore and fed on the toast-farina-tea diet of the average hospital, every one of them would have died of tuberculosis.

From the ship's cook was obtained the information given above as to provisions and daily menu; and then a formula prepared that is likely to strike every reader as the most outlandish prescription ever written by anybody for any purpose. Here it is:

1. To one pound of wheat bran add two pounds of water. Raise to 120° and allow to stand at that point for two hours. Increase the quantities in proportion given as may be necessary. Strain, and give each man eight ounces of the water every morning.

2. Boil cabbage, carrots, parsnips, spinach, onions and turnips together for two hours. The proportions are unimportant. Equal weight of each will do as well as any. Discard the solid matter. Feed the liquor as soup, in generous quantities, with unbleached whole-wheat bread, no butter, oleomargarine or other fats, no salt or pepper.

3. Wash and peel potatoes. Discard the potatoes. Retain the skins and boil them until tender. Discard the solids, and give four ounces of the liquor to the men every day.

4. Give each man the yolks of four fresh eggs, one every hour, every day, in as much fresh, unskimmed, sweet milk as he will sip.

5. At noon, with whole-wheat bread, without butter or other fats, give one ounce of fresh beef for its psychological effect upon people who think they cannot live without meat.

6. One hour before giving the milk-and-egg ration, give juice only of ripe oranges or lemons, diluted with water, without sugar.

7. Keep apples, raw or in the form of sauce with very little brown sugar, within reach of the men who are down in bed, all the time, and encourage them to eat one or the other freely.

8. At the end of the first week, add the solids of the vegetable stew, and give freely with the liquor, as suggested in No. 2.

9. Avoid cheese, whites of eggs, fats, white bread, cereals, pastry, puddings, potatoes except those baked or boiled in their skins, sugar, salt meats, polished rice and all acid-forming foods. (See table.)

Results: For the first five days after the Kronprinz Wilhelm anchored, the average number affected was five per day. The first day of the use of this prescription, the number dropped to one. Next day none—and that was the end. Forty-seven of the worst cases were dismissed from the ship's hospital during the next ten days.

This is the first time in history that such a test of modern diet has been possible. The test conditions were perfect, and demonstrated that 255 days is the extreme limit of systemic tolerance for our modern diet. Here were 500 men, practically shut up aboard ship, without communication with land, not having touched at any port, with the very finest kind of high-grade American diet, dropping like flies from no known cause, almost miraculously restored to full health and efficiency in a wonderfully short time.

Objectors may ask: "If that was the result on the Kronprinz Wilhelm, why don't people drop like that on land?" They do; but this is a big country, and a thousand may die every day without attracting notice. Besides, we on shore have recourse to what McCollum calls "Defensive Foods," green vegetables, cabbage, lettuce and the like; and to all sorts of fruits, which counteract effects that we now know to be deadly if left to themselves.—ALFRED McCANN, in *"The Science of Eating."*

Just received the following letter from Dr. L. P. Bethel, Editor THE DENTAL SUMMARY:—"Dear Harter—McCann's book received and is filled with information needed by every human being. Thanks for sending it".

Dr. Justin D. Towner, Memphis, Tenn., writes—"By encouraging the distribution of this splendid work you will do great good".

(Arrangements have been made with the publishers by which every copy sold to dentists helps to pay the cost of printing Bulletins of the Defensive Diet League of America. Price \$3.00 postpaid. Make checks payable to me, please.

If, when you have read it, you conclude that you haven't received the worth of your money, write me and I will dispose of it.—G. E. Harter.

AN IMPORTANT ANNOUNCEMENT
ULTRA-VIOLET RADIATIONS IN DENTISTRY

A. J. PACINI, M. D. CHICAGO, ILL.

DEPARTMENT OF BIOPHYSICAL RESEARCH, VICTOR X-RAY CORPORATION

WHEN BILLINGS SO BRILLIANTLY REVIEWED the subject of focal infection as to have awakened an entire profession to the danger that lurks in hidden infected recesses, medicine profited by two counts. First, from the scientific thoughtfulness conveyed by the writings of that master clinician, then, by cogently indicating how imperative it is to assay and appraise all the conditions likely to affect the human organism in its struggle for self-preservation. If for no other reason, there is in this latter teaching an important message to be appreciated at this time; that the progress of the medical world is an inherent belonging to the dental world, just as the progress of the dental world is equally vital to the welfare of medicine.

So that the study of Ultra-Violet radiation, a topic that in ten years has brought over twenty-six hundred contributions to the medical press of the world, though apparently inviting to the physician and surgeon alone, holds an intrinsic potentiality of inestimable benefit to the dentist; and it falls within the province of this and subsequent presentations, to furnish an evaluation of those inherent qualities possessed by Ultra-Violet radiations as make it foremost in the realm of therapeutic possibilities.

We may begin with the embryology of tooth development in which there comes a period when the integrity of the structures, and their orderly and proportional appearance, is dependent upon the proper balance of calcium and phosphorus metabolism. Any condition that threatens the quantity of available calcium and phosphorus in the blood, threatens at the same time the normal emergence of the teeth. And so in rickets, scurvy, scrofula syphilitic and kindred constitutional disorders, dentition is profoundly and often characteristically modified in such way as to furnish a diagnostic index of the undermining systemic fault. (Burchard and Inglis).

It has been definitely proved that a certain actinic fraction of the Ultra-Violet radiation furnished by sunlight, is capable of regulating the calcium and phosphorus balance in the blood. The clinical cure of rickets depends upon this fact; and it seemed to me certain that any agent successful in the cure of a disease through correction of a metabolic function, could be utilized prophylactically to insure that early re-establishment of normal calcium metabolism, would mean the eruption of a more perfect dentition. In kindergarten and early primary school grades such children as showed imperfect tendencies

in dentition were examined as to their blood content of calcium and phosphorus, and usually were found much below normal. The children of such parents as offered their consent and cooperation were irradiated under the Ultra-Violet energy in a manner that subsequently will be described; and at the close of the school year, untreated and treated children were compared with the finding that those submitted to the radiation showed an unusually improved denture, often perfect, as against the ridged and irregular teeth of the untreated controls.

Here then is a prophylactic measure that offers excellent opportunity for much preventive dentistry: the irradiation of poorly housed and improperly-nourished school children to insure not only a better dentition, but better health and nutritive state that brings with it the development of the proper physical requirements for successful educational standards. No mother objected to the Ultra-Violet irradiation of her child when she understood the harmless properties of the energy and its close resemblance to sunlight,—a factor useful for the community dentist's success who initiates the method in his local school system.

Examined in the light of these unusually attractive problems, we see at once the impelling necessity for a complete understanding of certain essentials, which include:

1. Nature of Ultra-Violet radiation
2. Clinical distinction of Ultra-Violet equipment
3. Biologic uses of Ultra-Violet radiation
4. Bactericidal uses of Ultra-Violet radiation

From these basic general considerations we are then in the position the better to understand the immediate application of Ultra-Violet radiation to dental problems, and we can then discuss the use of Ultra-Violet radiation in:

5. Aberrant eruptions of teeth
6. Developmental abnormalities
7. Enamel and dentin stains
8. Dental caries
9. Hypersensitive dentin
10. Dental pulp pathology
11. Septic pericemental conditions
12. Gingivitis
13. Pyorrhea alveolaris
14. Pericemental abscess
15. Reflex neuroses.
16. Infections of the mouth
17. Prophylaxis

The presentation is essentially dental, and the order of presentation followed is that given for the discussion of pathologic entities in Burchard and Inglis, "Dental Pathology and Therapeutics".

Remembering that Ultra-Violet radiation is a remarkably active energy efficiently utilized in the medical clinic, and that its dental applications are diverse and many, the contributions serially appearing in THE DENTAL SUMMARY should fill an important office—that of supplying a modern survey and appraisal of this exceptionally fruitful field of therapeutic possibility.—*Introductory article in a series of seventeen papers on "Ultra-Violet Radiation in Dentistry," appearing in THE DENTAL SUMMARY, beginning with the November issue.*



November 1 to 30, 1922

OBITUARY

DR. WALDO ELIAS BOARDMAN

DR. WALDO ELIAS BOARDMAN, who died at the Nebraska Methodist Hospital, Omaha, Nebraska, Aug. 14th, 1922, when returning from the meeting of the American Dental Association, held at Los Angeles, Cal., was born in Saco, Maine, September 1, 1851. He descended originally from the Boardman family, of Cambridge, England, who settled in Cambridge Mass., in 1600. On his mother's side, Dr. Boardman descended from Captain Jonathan Poole, a noted Indian fighter.

Dr. Boardman received his early education in the public schools of his native city and in the Bryant and Stratton Business College, at Portland, Maine. He first engaged in the boot and shoe business with his father, in Saco, in 1869. In 1871 he came to Boston and was a patent solicitor, in connection with patent cases, for nearly seven years, when his health failed owing to overwork. After some years' rest, he engaged in the newspaper business in New York City and the publication of a weekly trade journal devoted to the cotton belt. After a year's experience in the newspaper business, he entered the dental department of Harvard University in 1883, and completing a three-year course, was graduated from that institution June 29, 1886. He at once became an instructor in operative dentistry, and filled that position for ten years. He also became a member of the administrative board of the dental college in 1889.

Dr. Boardman's practice was confined to Boston, except for a time in Bristol, England, in 1899. He was curator of the dental museum of Harvard University from 1899 until the time of his death, and from a small nucleus built up a library of over three thousand volumes.

Dr. Boardman held practically every office in the gift of the members of the various dental organizations in Boston and Massachusetts. No man in the history of dentistry, in Massachusetts, has been as active as was Dr. Boardman, or has carried the burden of the executive business of the various societies so many years, or filled the positions as acceptably as did he. He was a member of the organizing committee of the Fourth International Dental Congress, held in St. Louis, in 1904; president of the National Dental Association in 1904-5; a member of the International Dental Federation, and various other dental organizations. He was a member of the Boston Art Club, the City Club of Boston, and a life member of

the Massachusetts Sons of the American Revolution. He was a member of the board of managers of the last named organization, for some years, and a delegate at National meetings of these organizations.

Dr. Boardman was a frequent contributor to dental periodicals and read many papers before dental societies. There is probably no member of the profession, in recent years, who has devoted so much of his time to the management of dental society affairs, as did he. For over twenty years he was a member of the Executive Council and a trustee of the National Dental Association, and at the recent Los Angeles meeting, he was elected a trustee of the American Dental Association for three years.

No man could have been more faithful and loyal to the interests of his profession than was Dr. Boardman. He ranked high as a business man and had executive ability of a very high order, which was freely given for the benefit of the organizations with which he was connected. He was a man of high-toned and splendid ideals, and was always ready to do his utmost for the uplifting and advancement of his profession. He was true, honest, loyal, and conscientious and his word was as good as any man's bond. He was always frank and open in the consideration and discussion of any question, and endeavored to work for the best interests of his profession. He was many times plain spoken and direct in his conversation, but always tried to put aside personal consideration in the discussion of the various questions that came up for decision. He was of a most kindly and generous nature, and a fine companionable fellow.

There are few men in the profession who enjoyed as wide an acquaintance as did Dr. Boardman, or who had so many loyal and devoted friends. He will be greatly missed by the members of the various organizations to which he belonged, and nowhere more than in the dental societies in his own state, where he gave so much of his time and substance. The dental profession everywhere is indebted to him, and his passing away will bring regret and sorrow to his friends throughout the world.

ULTRA-VIOLET RADIATION IN DENTISTRY

A New Department in

The Dental Summary

Created and Conducted by

A. J. PACINI, M.D.,

Head of the

Department of Biophysical Research

Victor X-Ray Corporation, Chicago

While comparatively a new field in dentistry, hundreds of dentists have already taken up the work and are treating many oral diseases that stubbornly resist other methods, with phenomenal results.

The very nature of ultra-violet radiation plus the almost uncanny results secured in the medical world, prove almost conclusively that there are many indications for this remedial agent in dentistry.

We consider ourselves most fortunate in being able to announce the name of DR. A. J. PACINI, Director of Biophysical Research of the Victor X-Ray Corporation as editor of the above section of THE DENTAL SUMMARY. Dr. Pacini is acknowledged as one of our foremost authorities on this subject which augurs well for our readers.

Dr. Pacini has scheduled 17 articles, the result of original research, one article per month for 17 months, viz: 1. Nature of Ultra-Violet radiation. 2. Clinical distinction of Ultra-Violet equipment. 3. Biologic uses of Ultra-Violet radiation. 4. Bactericidal uses of Ultra-Violet radiation. 5. Aberrant eruptions of teeth. 6. Developmental abnormalities. 7. Enamel and dentin stains. 8. Dental caries. 9. Hypersensitive dentin. 10. Dental pulp pathology. 11. Septic pericemental conditions. 12. Gingivitis. 13. Pyorrhea alveolaris. 14. Pericemental abscess. 15. Reflex neurosis. 16. Infections of the mouth. 17. Prophylaxis. These articles will appear in logical sequence and together with miscellaneous articles published co-ordinately, the dental side of the Ultra-Violet or Quartz Lamp section will be most thoroughly covered.

The first Pacini article will appear in the November 1922 issue.

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SOCIETY ANNOUNCEMENTS

The Susquehanna Dental Association of Pennsylvania

The Fifty-ninth annual meeting of the Susquehanna Dental Association of Pennsylvania will be held at Hotel Casey, Scranton, Pa., October 25th, 26th, and 27th, 1922.

George C. Knox, *Rec. Sec'y.*

Middletown, New York.

D. S. Gardner, *Chairman of the Executive Com.*
Scranton, Pa.

Massachusetts State Board

The Massachusetts Board of Dental Examiners will hold an examination October 3, 4, 5 and 6. Applications for this examination should be on file at Room 146, State House, Boston, at least ten days in advance of examination.

Very truly yours,

J. N. Cariere, D.D.S.,

Secretary

Michigan Dental Examination

The next examination to be held in this state for those seeking license to practice dentistry in Michigan will be held in the city of Ann Arbor, at the dental college building, November 13th to 18th, inclusive.

All further information may be had by addressing:

Dr. E. O. Gillespie, *Secretary*,

745 David Whitney Bldg., Detroit, Mich.

The Tennessee State Dental Association

The fifty-sixth annual meeting of the Tennessee State Dental Association will be held in Nashville, Tennessee, May 2, 3, 4, and 5, 1923, with headquarters at The Hermitage Hotel. A clinical and scientific program of unusual interest is being arranged.

O. A. Oliver, *President*

Joe Minor, *Secretary*

Lambuth Bldg. Nashville, Tenn.

J. W. Winn, *Chairman*

Lambuth Bldg. Nashville, Tenn.

Ohio State Meeting

The Ohio State Dental Society will hold its annual meeting at the New Gibson Hotel in Cincinnati, Dec. 5th, 6th, and 7th, 1922. Dedication of Memorial to Dr. John R. Callahan. Special railroad rates will be available. Make your hotel reservation early. The principal hotels are the New Gibson, headquarters, Sinton, Havlin, Metropole and Grand.

F. R. Chapman, *Secretary*.

The American Academy of Periodontology

The Ninth Annual Meeting of the American Academy of Periodontology will be held at the Hotel Gibson, Cincinnati, Ohio, December 4th, 5th and 6th, 1922. The Academy will furnish the program for the Wednesday evening general session of the Ohio State Dental Society, which will hold its annual meeting December 5th, 6th and 7th, 1922. The Academy members are invited to attend the meetings of the Ohio State Dental Society.

J. Herbert Hood, *Secretary*

624 Hanna Bldg., Cleveland, O.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held in Louisville, Ky., April 16th, 17th, 18th and 19th, 1923 Seelbach Hotel as headquarters. A clinical program of unusual interest is being arranged.

E. C. Hume, *President*

Wm. M. Randall, *Secretary*

1035 S. Second St., Louisville, Ky.

Geo. H. Means, *Editor of Program and Master of Exhibits*

Cherokee Apts., Louisville, Ky.

Robert L. Sprau, *Chairman of Executive Committee*.

Michigan State Dental Society

The Michigan State Dental Society will hold its annual convention March 27th-31st, 1923 in Detroit.

For information write Bion R. East, 504 Fine Arts Bldg., Detroit, Michigan.

Bion R. East, *Chairman, Local Arrangements Committee,*
Michigan State Dental Society.

Indiana State Board

The next meeting of the Indiana State Board of Dental Examiners will be held in Indianapolis, November 6th to 11th. For further information and applications for examination write to

Dr. H. C. McKittrick, *Secretary*

1006 I. O. O. F. Bldg., Indianapolis.

REPORT OF COMMITTEE ON DENTAL NOMENCLATURE*

BY L. P. ANTHONY, D.D.S., PHILADELPHIA, PENN., CHAIRMAN

YOUR committee begs to report as follows: The purpose of the nomenclature of dentistry as of any profession is to provide the means for the intelligible interchange of ideas to the end that its development and growth may progress and keep pace with that of the other professions.

Through its literature each profession becomes acquainted with the state of development of its sister professions and thereby is judged as to its intellectual status and the verity of its accomplishments. The scientific status, the exactness of knowledge, the cultural developments and the mental habits of a profession are distinctly reflected in its literature, and the retarding influence of insufficient and defective vehicles of expression must be removed if it is to keep pace with the other learned professions.

We are all conscious of the fact that the development of dentistry for the past two decades has been moving forward with such rapid strides that our present terminology no longer meets the demands of the science and imposes a serious handicap upon our progress that we can ill afford longer to ignore.

The expansion of the field of dental activities resulting from the general recognition of the interrelationships of oral infections and bodily disease has necessitated an equivalent increase in our descriptive nomenclature. In response to this need for a larger termin-

ology we have unfortunately been flooded with a group of terms that are manifestly amateurish in conception and defective in their etymology, hence they fail to correctly function as descriptive designations.

It is quite apparent that the busy practitioner is indifferent to this important phase of our literature, seemingly being content with and almost demanding that the subject be dealt with by those intimately concerned with the historical record of dentistry in the literature—namely, teachers, writers, editors, etc., they being in a better position to undertake the task involved in the harmonizing of our present terminology and enlarging it to meet our requirements.

Since the notable efforts of Black, Guilford, Molyneaux, Wilson and others at the time of the World's Columbian Dental Congress, and later those of the American Institute of Dental Teachers, little has been done to increase and enlarge our nomenclature, with the exception of some individual efforts. Individual efforts, while they may be praiseworthy and often productive of much good, inevitably lead to confusion in the use of several words to mean the same thing, and mainly serve to impress more forcibly the necessity for coordination of efforts to the desired end.

Any effort, however, to standardize our nomenclature should be made with

*Presented to House of Delegates, National Dental Association, Los Angeles, California, July 17-21, 1922.

*This report will be published in the *Transactions of the American Dental Association*, held in Los Angeles, California, 1922. These may be purchased at \$1.00 each through the office of the American Dental Association, 5 N. Wabash Avenue, Chicago, Illinois.

a definite purpose of conforming it as closely as possible to the general laws of nomenclature as already accepted by the biological sciences. The desirability of this course needs only to be mentioned here; so also is it only necessary to suggest the resulting enormous saving of duplication of work in the elemental phase of the undertaking that would accrue from this course.

There is a two-fold responsibility involved in the adoption of a scientific dental terminology. Terms must not only express their meaning with precision, but as in medicine many terms are used to express a relation to a pathological or other biological phenomenon. These terms must not only be correct in an etymological sense; they must be so coined as to have a correct scientific meaning, and those who originate them must not only possess the cultural fundamentals necessary to constructive work in the science of nomenclature, but must also have a broad scientific vision as well as an intimate knowledge of the subject in all its aspects.

Realizing the desirability of coordinating the various efforts being made to bring about uniformity of dental terms and conscious of the necessity for a distinct forward step in the field of dental nomenclature, the Dental Editors' Club, an organization composed of the editors of dental magazines of the United States and Canada, at its meeting in Milwaukee passed the following resolution:

WHEREAS, the Dental Editors' Club of North America at its meeting in Milwaukee, August 17, 1921, realizes the pressing need for standardization of dental terms, be it

Resolved, That the Dental Editors' Club of North America petition the House of Delegates of the National Dental Association to appoint a standing committee on nomenclature, to whom matters relating thereto ema-

nating from various committees on nomenclature of other organizations be referred for consideration to the end that the standardization and harmonizing of our technical dental terms may be under the direction and control of our national organization.

Pursuant to the intents and purposes of the above resolution, the National Dental Association appointed the following committee on Dental Nomenclature: Drs. C. N. Johnson, Otto U. King, H. E. Friesell, H. L. Wheeler and L. P. Anthony, as chairman.

Soon after the adjournment of the Milwaukee meeting, the chairman of the committee took steps to get in close touch with those who have shown interest in this phase of dentistry with the result that many suggestions from individual members of the profession were offered as to the adoption of new words and many criticisms made upon words now in use. We also have had the cooperation of several subordinate organizations of the National who have suggested words relating particularly to the specialties with which they are concerned.

The committee, while feeling the necessity of prompt action in regard to some of the words and suggestions offered, does not feel that it can present a final and definite report on all the terms that have been considered at this time.

It is not an easy task to decide upon the adoption of a certain class of words in dental nomenclature, as the conditions are continually changing and it is practically impossible in some instances to foresee all the difficulties that may subsequently arise in the use of a word.

As an example one word will suffice. All are familiar with the long drawn out discussion of the use of the words "model" and "cast." After so many

years the profession has about accepted the word "cast" as preferable to "model", as the word "model" is incorrect in the sense in which it has been so long used in dental literature. Now that "cast" has been accepted, the development of the method of inlay casting has much confused the use of the word "cast" so that now it is quite difficult in some instances to apply the word generally.

There is also much unforeseen difficulty in other phases of dental literature, namely, conforming our nomenclature to that of the other biologic sciences. We cannot afford to disregard the nomenclature of other sciences in forming our own, and, while there are instances in which we have by determined effort succeeded in establishing the use of some words which have conflicted with their use in other sciences, we do not feel that it is worth the effort and the resulting confusion consequent thereto. As examples of the latter, we might cite such words as "articulate," "cuspid," "bicuspid," "mandible," etc. In the case of the last mentioned word it has caused much confusion in anatomical nomenclature for the reason that the nomenclature of the teeth, jaws and surrounding parts has been built around the word "maxillary" applied to both jaws, and the adaptation of mandible has been difficult and thus far not accomplished completely in relation to the anatomical terms given to the parts contiguous to the mandible.

All of this may, however, be avoided if we keep to the suggestion in the forepart of this report, *i.e.*, that our nomenclature be designed to conform to that of the other biologic sciences.

The objection often is raised to so-called hybrid words, *i.e.*, words which

have both Greek and Latin derivative root words. This occurs to the committee as being more or less pedantic. The vast majority of the words of our language are of Greek and Latin origin, and such being the case there is no valid reason to the committee why, if the two languages are chosen and preferred as derivative languages, we should not avail ourselves of the advantages to be gained by a combination of the two in forming our words.

Generalities with regard to nomenclature, its purpose and the best methods of deciding upon terms are all well and good as suggesting principles upon which to work, but we realize that what is most desired particularly is some concrete result reached by the committee. We have therefore and with careful deliberation prepared a list of words which we recommend to the association for adoption and use in the sense in which we suggest they should be used. We also present some words suggested which do not seem to conform to the intents and purposes of dental nomenclature, and which we recommend be abandoned as promptly as possible.

LIST OF WORDS RECOMMENDED

alveolectomy (L. alveolus + Gr. ektome excision). Excision of a portion of the alveolar process.

alveolotomy (L. alveolus, [process] + Gr. tome, cut). Incision into the alveolus of a tooth, as for locating the end of a root of a tooth.

anesthesia. Preferable to anaesthesia.

apicoectomy (L. apex, gen. apices, the end [of a tooth root] + Gr. ektome, excision).

The operation of excising the end of the root of a tooth. To be used in preference to apectomy; apiectomy; apicectomy.

artificial denture. Preferable to plate.

cuspid. In preference to canine.

cementum. To be used in preference to cement.

conduction (adj.) To be used in preference to conductive, as in conduction anesthesia.

deciduous (adj.) To be used as designating the teeth of the first dentition, in preference to the terms "temporary," "milk" or "baby."

dentural (adj.) (L. dens, dentis, tooth). Relating to the denture.

first molar. To be used in preference to "six-year molar," "sixth-year molar."

mandible (L. mandibula from mandere, to chew). The lower jaw.

maxilla, pl. maxillae (L. maxilla, jaw). The upper jaw.

morsal and occlusal (adj). To be used synonymously as relating to the masticating surfaces of the bicuspid and molar teeth. centric occlusion. To be used to express the relation of the inclined planes of the teeth when the jaws are closed in the position of rest. •

eccentric occlusion. To be used to express the relation of the inclined planes of the teeth in the excursive movements of the mandible.

mesial and distal. These terms as used today have been objected to as not being in conformity with anatomical nomenclature, where they are used to indicate relation to the median line of the body. They have, however become so fixed in dental nomenclature that we do not suggest any change. pathodontia (Gr. pathos, disease + odous, tooth). That branch of dentistry which has for its purpose the study and treatment of diseases of the teeth.

pathology (Gr. pathos, disease + logos, treatise). That branch of medical science which treats of morbid conditions, their causes, symptoms, etc. This term is being loosely used to indicate a disease or pathologic condition, which is confusing, unnecessary, and undesirable.

pedodontia (Gr. pais, paidos, child + odous, tooth). That branch of dentistry which has for its purpose the study and treatment of children's teeth and mouth conditions.

periodontia (Gr. peri, around + odous, tooth). That branch of dentistry which has for its purpose the study and treatment of diseases occurring around the teeth and their roots.

periodontal (Gr. peri, around, + odous, tooth). Relating to the alveolo-dental ligament. To be used in preference to periodental.

periodontoclasia (Gr. peri, around + odous, tooth. + klassis, breaking [down]). The destructive degeneration of the tissues about the root of a tooth. Substituted for pyorrhea alveolaris; Rigg's disease; interstitial gingivitis.

periclasia (Gr. peri, around, + klassis, breaking [down]). Used as a shortening for convenience of periodontoclasia. Should be used with a qualifying word, as in itself it does not mean anything in particular.

pontic (L. pons, pontis, a bridge). (Adj. and noun). A substitute for a natural tooth. Used in preference to dummy.

bicuspid. In preference to premolar.

prosthesis (n.) (Gr. pros, to, + titheimi, to place). Preferable to prothesis. (Because of the more definite application of

the Greek preposition pros, as compared to pro in this form.

prosthetics (n.) Preferable to prothetics. (For same reason as in prosthesis.)

pulpless tooth. To be used in preference to "dead tooth," "devital tooth," "devitalized tooth." In cases where there is a "vital" pulp in a tooth or a "non-vital" pulp, it should be so designated; e.g., a tooth with a vital pulp, or a tooth with a non-vital pulp.

radiology (n.) (L. radius, ray + Gr. logos, treatise). The science of radiant energy. To be used as the generic term to indicate radiant energy from whatever source.

radiogram (n.) (L. radius, ray, + Gr. gramma, a writing). The product or tangible result, as the film or the print thereof, of the radiographic process, actuated by radiant energy of whatever source.

radiograph (verb) (L. radius, ray, + graph-ein, to write). The act or process of making a radiogram.

radiography. The art of making radiograms.

radiopaque (L. radius, ray, + opacus, shady. Term applied to a substance that is impermeable to the various forms of radiant energy.

radiolucent (L. radius, ray, + lucere, to shine). Term applied to substances that allow the passage of radiant energy light, but offer some resistance.

radioparent (L. radius, ray, + parere, to appear). Term applied to substances that freely transmit the light of radiant energy.

roentgen ray. To be used in preference to X-ray, and only where the specific ray is indicated.

roentgenology. The study and use of the Roentgen ray in its application to medicine and dentistry.

roentgenography. The art of making roentgenograms.

roentgenogram. The shadow picture produced by the Roentgen ray on a sensitized film, or the print from the film.

roentgenograph (v.) The act of making a roentgenogram.

second molar. To be used in preference to "twelve-year molar," or "twelfth-year molar."

third molar. To be used in preference to "wisdom tooth."

Vincent's infection. To be used to express the ulcero-membranous stomatitis caused by Vincent's spirillum and fusi-form Bacillus in preference to Vincent's angina; the latter being more applicable to the throat infection.

x-ray (n.) This word is used indiscriminately as a noun and verb. It should not be used as a verb. The word Roentgen ray is preferable. It should also be used with small x rather than with the capital X, if used at all.

penetology. These two words have been suggested, the first to mean odontolysis, the science of radiant energy, and the latter,

examination of the teeth. We see no justification for either etymologically or otherwise.

The committee is pleased to state that in the near future there will be available places of accessible record of the activities in the field of dental nomenclature that have not been open to the profession since the passing of Harris' Dental Dictionary. If the present plans mature as proposed there will soon be issued no less than three dictionaries devoted to dentistry, namely, one compiled by Dr. W. B. Dunning, under the auspices of the American Institute of Dental Teachers; one compiled under the direction of Dr. Louis Ottofy, of Chicago, and a third compiled by the chairman of

this committee. The committee and the profession can thus feel assured of a permanent continuing record of its activities in the future.

In concluding the report your committee earnestly solicits the co-operation of committees on nomenclature and of individuals who are actively interested in this subject, to the end that our nomenclature may be as expeditiously as possible enlarged to meet the needs of the profession*

Respectfully submitted

L. PIERCE ANTHONY, *Chairman*
C. N. JOHNSON,
OTTO U. KING,
H. E. FRIESELL,
H. L. WHEELER.

Committee.

*The House of Delegates by unanimous vote received, adopted and authorized the publication of this report.

A SCIENTIST of the Smithsonian Institute has perfected a cooker to use the heat of the sun as fuel. The apparatus consists of a parabolic cylindrical mirror with polished aluminum surface which focuses the rays of the sun on a tube filled with mineral oil which in turn communicates with an iron reservoir in which are two baking ovens. The heated oil circulating produces a very high temperature in the ovens, and it is possible to cook meat, vegetables, bread and other foodstuffs.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

Annual Roll Call of the American Red Cross

The Annual Roll Call of the American Red Cross for the registration of the membership for 1923 will begin Armistice Day, Nov. 11, and close on Thanksgiving day, Nov. 30.

The ground work for the stupendous task of reenrolling the membership throughout the world has been laid in a plan for the first complete and comprehensive system of registration of the Red Cross membership in all its active 3,300 Chapters at home and abroad. Another important feature of the round-the-world Roll Call campaign will be a universal effort to re-enlist the active service of wartime Red Cross workers in the peace program by their participation in the Roll Call. In this way that vast army of volunteers will once more affiliate with the work of the Red Cross in its manifold phases.

Thousands of Chapters will adopt the home canvass plan of enrollment this year, a plan which originated in Pittsburgh where last year it resulted in an increase in membership of fifty per cent. All records in this year's campaign will be kept on a standard size filing card which will be filed by each Chapter, thereby furnishing a permanent record of the membership in each Chapter's jurisdiction.

The outlook for an increase in membership over the record of 1921 is considered most promising for it is apparent that the public is now accurately informed as to the peacetime obligations the Red Cross is carrying out. The Roll Call Committee in charge of the campaign is composed of Chairman John Barton Payne, Vice Chairman James L. Fieser, Dr. Arthur W. Dunn, director of Junior American Red Cross; Mrs. John Allan Dougherty, Manager of the Washington Division; M. G. Scheitlin, Director of Public Information, and Douglas Griesemer, assistant to the Chairman. The membership of the American Red Cross now is approximately 4,500,000.

Rules for Care of Teeth Adopted by British Dentists

Here are the rules of the British Dental Association for the care of children's teeth:

Be sure the child sleeps with the mouth shut, and when awake breathes through the nose. From the age of 2 let each meal contain some food that needs grinding. Begin the child's education in hard foods at nine months by giving it a bone, preferably a chop bone, with a little meat on, to exercise its gums. Do not let children drink until the

end of the meal. Avoid many sweets and sweet biscuits, and only give them as a part of a meal. Finish each meal with a piece of fresh fruit or crisp salad, or, if these are not obtainable, a stale crust of bread, with butter if preferred, but not with jam.

ALFONSO GREETES DENTISTS

Opens Their International Congress in the Spanish Capital

Madrid Sept. 4. King Alfonso today opened the sessions of the Odontological Congress at Retiro Park. The delegates number more than 400, representing nineteen nations. Among the delegates are Drs. T. W. Brophy, of Chicago and Edward C. Kirk, representing the United States, and Dr. Rojo, of Mexico.

The King in the course of his speech thanked the assembly for choosing the capital of Spain for the congress and promised to push forward the project for the creation of a Faculty for an odontological university in Madrid. He alluded to the progress of dental surgery, making special reference to military dentistry, which he considered not solely an act of charity, but an economic function, because man held first place in the value of a nation.

Dr. Brophy also spoke, enumerating the immense strides in dentistry in recent years.

Dr. C. D. Peck, 61 Years Old Wins Running Race in Old Home Town

Although he admits he is 61 years old, Dr. C. D. Peck, of Sandusky, Ohio, is still an athlete and is interested in athletic sports.

Some weeks ago Dr. Peck was informed that his home town, Streetsboro, O., would celebrate the 100th anniversary of its founding and he at once suggested that a program of athletic events be staged on the old baseball diamond that saw service more than forty-five years ago, offering a prize of two pounds of Martin's chocolates to the man forty-five years or more of age who would circle the bases in the fastest time. The plan met with favor and several prizes were hung up.

When the events were staged Dr. Peck won first place in the race against time around the diamond making the circuit in 21 1-5 seconds. Three men were tied for second place each circling the bases in 25 seconds flat.

"The paths were rough or I believe I would have made it in better time," said Dr. Peck. He was awarded a special prize for his feat.—*Sandusky Star-Journal*.

Why Floss Silk must be Surgically Clean

Dental Floss Silk is one of the accessories used by the operator and by the patient that recent research and developments teach us *must be surgically clean*. Used as ligatures about the necks of the teeth, laceration of the gum is frequently unavoidable. In cleaning the spaces between the teeth, the silk is often drawn beyond the margin of the gum and while the mouth itself is not in an aseptic condition, it must be guarded against outside infection with every care possible.

Johnson & Johnson manufacture dental floss silk within their own factories for dental and surgical purposes only, using the best grade of raw silk selected for this purpose and handled by surgical methods throughout.

New Era Floss is surgically clean. The air-tight glass container with rubber eyelet maintains this surgically clean condition. The selling price to the dentist is no higher than for the ordinary kinds.

New Era Floss (Surgically Clean). Put up in 12 yard, 24 yard, and 150 yard Aseptic Glass Containers.

We depend entirely upon the dealer for the distribution of our product.

**Sold by leading Dealers in Dental Supplies
in every country in the world.**

Specify Johnson & Johnson's
New Era and you will get it.

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New Brunswick, N.J., U.S.A.

DEATHS

At Sioux City, Iowa, August 10, Dr. H. S. Evans, 45, instantly killed in auto accident.

At Lake Placid, N. Y., August 16, Dr. Charles A. Coppinger, of Jersey City, N. J. Heart trouble.

At New Lots, Brooklyn, N. Y., August 15, Dr. John K. Powell, 73.

At Indianapolis, Ind., August 8, Dr. M. F. Ault, 64. Burial at Kokomo, his old home. For many years Dr. Ault had been connected with the Indiana dental college.

At Dandridge, Tenn., August 15, Dr. J. E. Davis. Heart failure.

At Lexington, Ky., August 14, Dr. Lee F. Huffman, 66.

At Worcester, Mass., August 16, Dr. Eugene Ellinwood, 71.

At Chicago, Ill., August 25, Dr. Amos J. Nichols, a member of the first graduating class of the Chicago dental college.

At Charlotte, Mich., August 18, Dr. W. C. Puffenberger, formerly of Eaton Rapids. Suicide by shooting.

At Aberdeen, S. D., Dr. A. W. Fossum. Diabetes.

At Brooklyn, N. Y., August 25, Dr. Robert B. Cantrell, 77. He was noted in dramatic circles, having travelled to many cities forty years ago, presenting "Mrs. Jarley's Wax Works."

At Selma, Ala., August 16, Dr. Porter W. Whitby, 77. He was a veteran of the Con-

federate army, and had practiced dentistry for fifty-five years.

At Ware, Mass., August 22, Dr. George M. C. Barnard, aged 63.

At Denver, Colo., September 4, Dr. George S. Mason was killed by the overturning of his automobile within an hour of reaching his home after a four-month's tour.

At Quincy, Ill., September 5, Dr. C. T. Hewes, 65.

At Bloomington, Ill., September 3, Dr. J. M. Gallahugh, of Chenoa, 69.

At Jersey City, N. J., September 10, Dr. Alfred Haggerty.

At Memphis, Tenn., August 10, Dr. Arthur A. Johnson was fatally injured by a fall from a hotel window.

This is the way to do it: W. T. Sherman, 53, certainly old enough to know better, was given his choice, August 19, by a New York court, of paying a fine of \$500 or serving ninety days in jail for practicing without a license. This same man paid a fine of \$50 for the same offense in May, '18—and went right on practicing! Either no attention should be paid to such offenders or the punishment made severe enough to be felt.

If any reader of THE SUMMARY has a place for a graduate hygienist, who is willing to act as his assistant, I will be pleased to put him into correspondence with one looking for a job.



The **First & Final Selection**

*—no sending for “several sets”—
hoping that one of them may “do”*

WHEN a dentist asks his dental depot to send him “a few sets for selection,” he doesn’t realize what his request involves. He doesn’t realize the cost to his depot, the inconvenience to other dentists and the loss to himself, or he would choose a more efficient method of selection.

Most orders for a selection call for three to six sets of teeth of approximately the same size and shade. A few such requests leave the dealer's stock short of those moulds and shades, and other dentists are unable to secure the teeth they need.

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The use of a Trubyte Mould Guide and Selection Rim will enable you to select teeth that harmonize with your patient's face form and permits you to try the six anterior teeth, arranged on the Selection Rim under the patient's lip, so that both you and your patient can see just how they will appear when set up.

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Your dental depot is willing and anxious to render you a valuable service, but when you think of it there is an enormous amount of lost energy and actual expense involved in the old custom of ordering several more sets of teeth than you expect to use, only to return them in the (sometime distant) future for credit.

Mould Guides for Trubyte Teeth and our other products put the dealer's stock at your service.

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PULP-LIFE

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The dentist who uses Pulp-Life to assist Nature in saving exposed pulps, finds professional comfort in his continued success.

Many dentists tell of Pulp-Life virtually performing miracles. However, most certainly much of the credit is due the professional man who desires to save life before filling and seeks out the product which will serve his ideal faithfully.

Full directions accompany each package of Pulp-Life. If you prefer to go over the directions first, we will gladly send a copy.

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NING DISCS AND STRIPS, NUK-
LORENE AND SPECIALTIES.**

Dr. Stephen Smith Dies at 99 Years

Dr. Stephen Smith, ninety-nine years old, died August 7, at Montour Falls, N. Y. He would have been 100 years old next February. Death was due to general debility.

Dr. Smith was long known both to his profession and to the public as the "Father of Public Health." When he was graduated from the College of Physicians and Surgeons in 1850, there did not exist throughout the length and breadth of the United States a single organized scientific body charged with the care of the public health of any city or of any State, and even in Europe sanitary science had but recently begun to attract the attention of statesmen.

Within little more than a quarter of a century following, Dr. Smith had become founder and first President of the American Public Health Association; creator of the New York State Health Department and the New York State Lunacy Commission and author of the law for the State Care of the Insane, and of the Metropolitan Health Bill and of the bill creating the National Board of Health, whose name later was changed to Marine Hospital Service. He was Commissioner of Health of New York City from 1868 to 1875.

The future exponent of health and long life was a sickly child, and a chronic dyspeptic until he was fifty years old. When he was ninety-eight, he said: "To advise any one how to live long, I would say, be sick the first fifty years of your life and be compelled to live on milk, and the next fifty years you probably will be compelled to enjoy life."

Ill health, however, was not allowed to interfere with his career. When he was graduated from the College of Physicians and Surgeons of which he was to become the oldest living alumnus, he went into Bellevue Hospital as an interne. That institution then stood in the fields and the only conveyance between it and the city was a stage-coach. The city was in a horrible condition from a sanitary standpoint and in the busy years of practice that followed, the young physician became convinced of the necessity for the movement of which he was pioneer and dean.

The list of his professional distinctions is too long to give in full. He founded and organized Cornell University Medical College at First Avenue and 26th Street and was on the faculty for ten years; he prepared plans for Roosevelt Hospital and was one of six who planned Johns Hopkins Hospital in Baltimore. He wrote the handbook of surgical practice which was used during the Civil War and he was editor of the New York Journal of Medicine and the New York Medical Times. For many years he was a member of the State Charities Commission.

He constantly urged that one of the aims of public health work should be to extend the standard for the length of human life

at least thirty years. His own physical vigor during the latter part of his life caused him often to be asked for the rules that made him able, at ninety-eight, to walk several miles a day, to work three hours daily with a typewriter at a forthcoming book, and to retain his enjoyment of life undiminished.

To an old woman who asked the question, he replied with a smile "Never talk with old people. Live in the age that you are living in. Shut the door behind you and look forward to the development of the future."

To reporters he often said: "Every man who dies before he has lived 100 years, in almost every instance dies by his own hand—or, rather, by his own knife and fork.

And finally, he drew up this set of ten rules: "Eat hardly any meat.

"Drink lots of milk. If it disagrees with you, drink more.

"Take a ten or fifteen minute nap after luncheon and dinner.

"Sleep ten hours.

"Take a nap outdoors when the weather permits.

"Don't smoke.

"Don't eat sweets.

"Take no alcoholic or other stimulants, like tea or coffee.

"Avoid the easy-chair; absence of work is the first step to the grave.

"And finally, just be natural; quit all foolishness."

An outing of the North-Central Ohio Dental Society held at Norwalk Country Club July 19th, was one of the most successful, useful and pleasant meetings ever held by the Society.

One of the most useful and interesting features was the Round-Table discussion of certain questions included in the program. One of these questions propounded by Dr. Seeley was "What Part of Your Practice Gives You the Greatest Pleasure?"

Replies to this question are printed in this number of THE SUMMARY, and we hope will arouse discussion on the part of readers.

We would like to see this method of conducting meetings become general, as many subjects are brought out and talked upon instead of only one or two as is usual.

Isn't it a little singular that although it is well known that about four out of every five people get pyorrhea after forty nobody seems to have seriously suspected diet as having something to do with it?

Mrs. Jennie Vallin, of Brooklyn, is certainly wasting her time in suing her dentist for \$20,000 for the loss of all of her teeth, due, she claims, to the leaving of a piece of broken broach in one of her teeth three years ago. If she is able to win her suit and collect that amount, I've an idea that the dentist will be as much surprised as she will be.

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Should you not recommend the one that meets all your requirements?

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Mr. Frank Taylor, of The S. S. White Dental Mfg. Co., has been named new national councillor for the American Dental Trade Association to represent it in the Chamber of Commerce of the United States.

The National Council of the Chamber of Commerce of the United States consists of one representative each from the more than fourteen hundred commercial and industrial organizations making up the National Chamber's membership. It serves as an advisory body to the National Chamber's Board of Directors. The Council holds a special meeting preceding the annual convention of the National Chamber to pass on the program and to select a nominating committee. The councillors also act as chairmen of the delegations representing their organizations.

A councillor occupies a position of liaison officer between the National Chamber and his own organization on important questions.

The Chamber of Commerce of the United States is the strongest commercial organization in the world. Its object is to encourage trade and commerce; increase the efficiency of American business organizations; to obtain uniformity and equity in business usages and laws and to get proper consideration and concentration of opinion on questions affecting the financial, commercial, civic and industrial interests of the country at large.

A system of referenda operated by the Chamber has met with unusual success in obtaining the viewpoint of business men on national questions. These opinions, when they point to the need of legislation or other governmental action, are transmitted to the government's executive officers and to Congress by the National Chamber's headquarters at Washington.

I am getting a little leary about the constant use of the tooth-brush. Shouldn't be surprised if I got clean over on the other side some of these days and advised people to use a cotton roll every day, to keep the outer surface clean and polished and esthetically acceptable, and then depended upon a monthly visit to the dentists for a real cleaning. The brush never cleaned the teeth anyhow and never can. It is just one of those little illusions that most of us fool ourselves with. Every dentist knows that some sets of teeth seem simply to melt away, no matter how often the brush is used. And I wonder why so few of them seem to suspect incorrect diet as the underlying cause. That's the answer.

Readers of THE DENTAL SUMMARY are invited to send in reports of any unusual cases of X-ray work, abnormalities discovered, difficulties in reading and interpretation, suggestions, etc., that may be useful to other readers. We want to make THE DENTAL SUMMARY of more than usual benefit along these lines.

Marquette's new dental building is reported ready for occupancy.



Standard Investment Compound

Does not depend on Plaster of Paris for its hardening qualities.

Standard is composed of materials that set harder and are more fire-proof than others. The setting process is accompanied by strong crystallization, yielding strength and porosity.

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OHIO

"50 Years of Service"

Dietary Notes

Understanding that meat-foods *never* are necessary, and that the muscle-meats commonly used for food are the lowest in value of any of our common foods, it would seem to be wise to regulate our consumption of meats to a desirable minimum, say a few ounces daily, an amount that may be balanced by ordinary quantities of alkalin foods—say, a dinner-plateful of salad made from lettuce, cabbage, peppers, tomatoes, etc., eaten at the meat-meal.

By "muscle-meats" please understand steaks, chops, roasts, stews, ham, tenderloin—all sorts and kinds of meats except fats, brains, liver, pancreas, etc., from any species of food animals. Fowls, game, etc., are in a slightly different category, but just what that difference is I do not know now. Tilden (Denver) says that the substitution of fowls for pork will go a long way toward the eradication of hook-worms.

In making up a dietary for yourself or for your patients, keep the vegetable and raw fruit side of the balance decidedly heavy. For instance meat once per day if at all with some bread made from undenatured flower or meal, boiled, steamed or baked potato, creamed onions or carrots, or parsnips or *string* beans, with a *big* serving of raw vegetable or fruit salad, and a raw-fruit dessert. Follow something of the same formula for the other meals, excluding the meat—and be *sure* to get in a good, big serving of tomatoes, several times each week, with plenty of raw onion, either alone, in the salads, or with the tomatoes.

Dr. C. H. Mayo, Rochester, Minn., (the famous surgeon) writing in The American Journal of Surgery, says in substance, that constipation cannot exist in the presence of alkalis. In cases of obstinate constipation surgical interference upon the pylorus often is resorted to. Mayo says that if and when alkalis can be brought into contact with the pylorus relaxation follows at once and the stasis is relieved.

Tomato juice is equivalent to orange and other citrus fruit juice in both vitamin and alkalin content. This is good news, with oranges at 12c each, and poor quality at that. Tomato is one of the few foods not altered by canning. Tomato seeds are about 34% protein.

"It has become common knowledge that not only the traditionally used fruit juices but also many greenstuffs have considerable antiscorbutic potency, that is, they contain the so-called vitamin C. Some of the highly potent antiscorbutic foods, such as cabbage, turnips and tomatoes, are usually so readily available and so well tolerated that one need not search among more expensive products for protective material.

The efficacy of the citrus fruits is widely recognized."—Journal A. M. A.

Givens, McClugage and Van Horne have demonstrated the antiscorbutic value of *raw* apples and (*ripe*) bananas.

Cooking or desiccating very greatly impairs this property, particularly heat long continued, even of a low degree, as when foods are kept hot a long time between cooking and serving.

Cold storage does not affect the qualities of fruits and vegetables as does heat, so far as vitamins and alkalis are concerned.

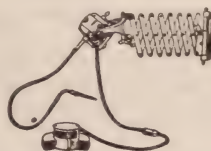
Hess, Moore and Calvin (Chicago) have completed a series of experiments upon a group of artificial products supposed to carry vitamins, widely advertised and sold as remedies for vitamin and alkalin deficiency. They agree with McCollum that such things are merely commercial products of little or no value; and conclude:

"It is becoming more firmly fixed in the minds of leading investigators that, except to meet specific indications, as in times of famine and certain economic up-

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heavals, such as in war, the best method of obtaining sufficient vitamins is through a proper selection of foods. Vitamins should be obtained from the dairy, grocery and the market, not from the drug store."

QUESTIONS AND ANSWERS

Q—Has sauer kraut the same virtues as cabbage?

A—I think it has, if eaten raw. My only objection to it would be its heavy salt (chlorid-sodium) content, and much of that may be eliminated by washing. Several very remarkable recoveries from malarial attacks following the eating of raw kraut have been reported. None of our authorities mention kraut. It seems not to have been the subject of experiment as yet. Cooked kraut I would consider useless, except for its mineral salts content. Vitamins are destroyed, of course, by long cooking. To get the benefit of the mineral content all juices and the water in which it is cooked must be eaten.

Q—Should one use vinegar in foods?

A—No. Use juice of fresh lemons instead. So far as I know, no authority has a good word to say for vinegar nor for pickles or preserves made by its use.

Q—What do you think of green string beans?

A—Fine. Eat all you like. Neither chemically or biologically does there seem to be any relation between green string beans and the dried "navy" bean of commerce. The latter is unfit for food in any form. (Good-bye old Boston Baked Beans and P. and B. We're sorry, but old friends must part!)

Q—What is your opinion of postum as a beverage?

A—Rotten! I'd as soon drink sweetened water. But it is harmless, so far as I know, unless the sugar and cream usually added give it a bad effect. It is nauseating to me.

Q—Is coffee harmful? Does it cause "bilious headaches?"

A—McCollum says but little is known about coffee, except that it is alkaline, has some good effects and some bad ones, one about balancing the other. Dorland says—"It is invigorating, tonic and conservant; prevents tissue waste. Useful in chronic asthma, headache and opium poisoning." I doubt the ill-effects of coffee if taken without cream and sugar; but consider the mixture as very bad, hard to digest, and with nothing to recommend it except the flavor.

Most so-called bilious headaches are really kidney headaches. Better analyze for acid.—From Bulletin No. 4, Defensive Diet League of America.

Education—Vocational and Other

Dentistry in America is not a mechanical trade. It is a highly-skilled profession. Whether American doctors, lawyers, professors, are superior to the run of their colleagues in Europe is highly arguable. That American dentists are superior to those of any other country is not arguable. It is a fact everywhere admitted.

Why is it, then, that the followers of this profession are so seldom distinguished men of affairs, citizens widely known for their general service to the community? There are plenty of doctors so distinguished, plenty lawyers.

Among dentists such really leading citizens are curiously rare. Do the dentists accept this situation placidly? Does it never stir them to rebellion?

The cause, if they seek it, is easy to discover. It lies almost wholly in the kind and quantity of their education. It is for this reason we venture to comment on a situation which might otherwise seem not particularly our business.

The great majority of those who control dental education seem to think that technical education is all that is required.

A dentist is educated as a trained nurse is, not only for his vocation, but for his vocation only. It is not long since he did not even need a high school education. No general education beyond that is anywhere required of him.

Therefore his interests are narrow. Therefore his sense of social responsibility is seldom keen. Therefore, while he may know what a dentist ought to know, he often remains ignorant of what an all-around ambitious young man ought to know if he is to develop to the extent of his capacity.

The point is that not dentists only, but too many young men and women in general, make this mistake. Vocational education is an essential. For many it is the best education possible. But anybody who is preparing for a profession like dentistry or the newspaper business, which gives him scope for the full and free exercise of his philosophic mind as well as for sleight-of-hand, makes a bad mistake if he contents himself with a vocational education only.

As some day, looking backward, he will gloomily admit. And the more interested he is in his profession, the more surely and the more gloomily he will admit it.—*Chicago Herald*.

Classified Advertisements under this heading, \$2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more special rate on application.

FOR SALE—Established practice in county seat town of 2,500 in northern Ohio. Will sell at invoice or \$1,000 cash. Reference, Ransom & Randolph Co., Rose Bldg., Cleveland, 1010-C

DENTAL HYGIENIST—Licensed in Ohio. Desires position in an ethical office. Graduate of the Rochester School of Dental Hygiene, class of 1922. Will also act as an assistant if the doctor so desires. References exchanged. Hazel E. Crum, Ashtabula, Ohio. 1020-P

REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XLII

NOVEMBER, 1922

No. 11

THE USE OF HIGH FREQUENCY IN DENTISTRY*

BY MILTON D. NEFF, D.D.S.,

AND

SIGNOR ANTONIO LONGORIA, CLEVELAND, OHIO.

WHEN THE DENTIST uses the high frequency current, he holds in his hand one of the most valuable weapons with which to combat disease. In the elimination of pus the lance often is necessary, but it will not assist the blood in carrying away deep-seated germs. It will not destroy germs that lie right beside the very incision. The same facts are applicable to the treatment of pyorrhea. Scalers are necessary, medication and washes are invaluable, yet many cases would continue to retrogress without the aid of the high frequency stimulus.

Think of the high frequency electrode as though it were a nozzle for a spray. You hold in your hand a spraying outfit that is a most powerful germicide as well as a benign stimulant to healthy tissue. It is not confined to the surface as are all topical remedies with which we are familiar. Its subtle nature permits it to enter the deepest parts of the body with its healing, nourishing elements.

We more readily understand what appears to be a new principle when it is compared to those familiar to us. So you will permit reference to some common agents. Dakin's solution proved valuable in severe cases, but it required expert attention in protection of healthy skin surfaces. The whole list of useful proprietary preparations are so limited in efficiency as to make the comparison with this electric spray of tremendous proportion.

Pathologic conditions evidenced on the surface, exist just as virulent in deeper layers, but cannot be reached with these topical remedies. How often you yourself have said "If I could only effect the same cleansing and stimulating condition throughout the

*The second of a series of three articles written exclusively for THE DENTAL SUMMARY.

layers of tissue that I am securing on the surfaces and in the pockets, I could expect recovery. My efforts are so limited I must depend upon nature to a large extent. About all I can do for these afflicted patients is to clean up conditions and stimulate the surfaces to get the circulation enlivened for better nutrition and elimination."

But what of those persons whose vitality is low and to whom such stimulation is merely a whip? Can you expect lasting results? Can anything more than temporary relief be promised those patients? And they are the ones where these pathologic conditions are worst. Of course it is rational to prescribe systemic treatment and insist on hygienic regime, but can we be excused for neglecting to inform ourselves so as to utilize nature's own vitalizer, and be accomplishing all these desired results with the high-frequency spray of electricity?

An exposition of results that are obtained with its use would be convincing, so we propose to set forth these results and interest you to use this greatest power on earth for the increased service that you will be enabled to give your patients.

Look all about you to realize how widely electricity is employed in diversified forms and acknowledge that we have been slow to avail ourselves of this form of electric energy, refined to a therapeutic basis and without baneful effects.

If the reader happened to glance over the preceding chapter appearing in the last issue of *THE DENTAL SUMMARY*, he would be ready to argue this point of using a "harmless form of electricity." We are constrained to keep up our side of the argument until you are interested enough to try it, then you, too, will become enthusiastic. However, you will have to learn the simple technic and handle it "just so," or you will not get the desired results. Doesn't this hold true in all the methods being shown us at our clinics year after year? Modify them if you choose, but don't blame the clinician if you do not get the same results. Better follow the instructions that were carefully worked out after much experimenting; familiarize yourself with this method, and its why and wherefore; then if you see a chance for improvement he will welcome your suggestion just as eagerly as you may be to give it.

Because the high-frequency current, or violet ray, as it is commonly called, became so quickly commercialized, many professional men were disposed to ignore it. For apparently people could use it themselves, why do it for them? "It is probably only a fad anyway, and likely hasn't much real value in it." This assumption is made without knowing! Occulists say that we could prevent most eye troubles, but we don't do it; we go to them because we have neglected our eyes and we know that they are expert in the care of these delicate organs. Dentists always will be called upon to care for pus cases in spite of our teachings for prevention.

When you have lanced an abscess and washed it out after your own method, apply the surface electrode with strong current over a large area on face or jaw for at least ten minutes. Next use an applicator with your own choice of germicide held in the little cup on cotton. Place this lightly with mild current directly on the incision. The current will carry the medicament into the deeper layers of tissue and assist in creating the same cleanly condition throughout which you formerly were able to do only on the surface. To assist in localizing the effect of the current it is recommended that the operator ground the patient so as to draw the current through the affected tissue, rather than permitting it to be disseminated throughout the body, for the surface electrode has just accomplished the stimulation of the circulation and it is ready for your direct onslaught upon the disease germs.

It is a much mooted question among electrotherapeuticians as to how the high frequency current accomplishes its beneficial effects. We will have to be content in knowing that it does, for in fact all civilization wants to know how electricity performs its wonders, but we are nevertheless happy to use its many forms of power.

Since this paper has been granted a wide scope of discussion, a little digression on some of these arguments may be acceptable. To "ground" the patient merely requires that the operator draw the current into his own body, either by placing a finger on the opposite side of the tooth about which the abscess occurred, or by holding a flat metal-handled instrument firmly against the tissue. Pressing the back of a mouth mirror against the tissue answers very well. For instance, if lancing is done buccally over an upper bicuspid, place finger against the palatine surface near that tooth and continue for five minutes. Do not overdo this method of concentrating the current.

An assistant who is thoroughly familiar with handling high frequency can be of still further service to that patient by following up your work with frequent applications through the surface electrode. Should the abscess be in the jaw, especial attention must be given to the glands extending along the under surface. These are often found to be sore, due to being overtaxed in their effort of filtering the toxins. Nor is the area of their function confined to the jaw, for serious glandular involvement has been directly traced to abscesses of upper teeth.

A recent case in our practice had developed so far before presenting that the surgical removal of the cervical glands of that side was necessitated with our extraction of an upper bicuspid. If nature can only be assisted in time, large masses of tissue can be saved from breaking down.

The spark of life which constitutes the difference between live and dead tissue is in reality electricity. The cells of the body are

perfect electro-chemical laboratories, making their own electricity from the elements furnished in our food. During activity this energy is used up and when the body is at rest more electric energy is stored up. Hence it is readily understood that when a certain part has fallen below par, because of the overwhelming inroad of germs and the inherent life of the part is endangered, it is highly efficient to replace some of the depleted stock of electricity in the cells of that tissue by the application of this electric spray. It is the one form in which electricity is actually absorbed by the body. Other forms of electricity may be induced into the body but their effect is merely to percolate through the tissue, either stirring it up or unduly straining certain components.

It is demonstrated that the cells of motor nerve tissue upon fatigue are depleted; their Nissl granules containing organic iron are used up. The blood contains the elements requisite for replacement, but the natural process is slow and requires hours of relaxation, most effectually during sleep.

With the assistance of high frequency this assimilation is rapidly accomplished, and throughout the diseased tissue comes a new tone in time to save its defeat in the conflict with germ invaders.

On the subject of pyorrhea, the reader will now be more disposed to accept the claims made for an electric treatment in conjunction with your usual procedure. If there is any tissue that appears below par it is certainly that affected with this disease,—the white plague of dentistry. If there is any place in the body that needs toning up, it is the alveolus and overlying tissues. Is it any wonder that many forms of treatment do not thoroughly avail when they do not embrace any means of building up tissue? As suggested, they depend upon natural forces of the body and act as a whip to bring about results. But the tissue called upon to do this restitution has lost so much of its power that it is incapable of keeping up the pace, and results are not wholly permanent. Too many cases under observation of us all, that have had regular attention at the hands of skilled operators for years, gradually decline to the point where so much of the alveolus has disappeared that extraction is finally necessary.

In employing high frequency for the treatment of pyorrhea some superficial cleansing should be done with scalers and washes before the first application is made with the pyorrhea electrode. As mentioned previously, place small pellets of cotton, saturated with a preparation of tannic acid, iodine and glycerin, in the interproximal spaces.

As the electrode is moved slowly back and forth over the inflamed gums, the solution is being driven by the current to some degree into the tissue. This is a true osmosis. The electrode should not be brought onto the teeth, because of the sparking it would cause. Pass the little ball end of this electrode over the gums al-

most to the ends of the roots. Do not rub it on the tissue which is mobile as it arches away from the ridge to join the buccal tissue. That membrane is apt to be irritated by this severe treatment.

Each time that scaling is done, follow that work with the high frequency. You may be able to reach the full extent of the pockets on the second appointment. But whether you do or not, each time will bring marked improvement of a deeper and more substantial character than you have secured otherwise.

Appointments may be made as close as alternate days. When your final scaling is completed, do not put an instrument into one of those pockets again. But instead, visualize what nature is being enabled to do, now that you have cleared away the debris. Be content to persevere in the electric treatments, merely washing into the mouths of the pockets and interproximal spaces, before placing the solution on cotton as heretofore.

By this time many patients will have become familiar enough with the use of the electrode so that with a few words of direction they can apply it themselves. A saliva ejector is used to best advantage to prevent the solution from being washed away.

A week after the final instrumentation you will be anxious to check up on your work, and can do so by slight pressure with the finger tips as you are used to doing over the pockets, to see if any pus exudes. If it does, you may be warranted in a very delicate examination to find out if you have missed some deposit. Otherwise you will not want to injure the new granulations. Weekly appointments should be rigidly required even after all traces of inflammation have disappeared. After the first month your judgment may allow two week's intervals but not longer during the first year. *We contend that controlled pyorrhea is actually cured.* But tissue once invaded is never immune. Systemic conditions which may have contributed to its start are still likely to occasion its return. Your directions for care of the mouth and these occasional electric treatments will keep the tissue normal. If that isn't cured, what is? You may have dyspepsia and be cured, but only your good judgment and care will keep you so. No iron-clad immunity can be secured from it.

The principle of induction applies to treatment of roots on the basis of an ionization. Where skiagraph shows infiltration about apex, you can be reasonably assured of success. Being able to carry iodine, broken up into ions, into the affected tissue makes it possible to so stimulate the impaired circulation that it is able to cope with the situation which your attention has simplified. For the very use of this current through the tissue is doing its share of bacterial destruction and at the same time nourishing the cells toward regeneration.

The following technic has proven most satisfactory:

A long-shanked broach is wound with a few shreds of cotton, saturated with iodine and placed well up toward the apical foramen. The solution must penetrate the foramen so that actual contact exists with that tissue beyond. A little pumping may be necessary if desired evidence is not manifest at first induction of current.

An assistant should hold a surface electrode with mild current a few inches from the patient, so that the operator may complete the connection with a mouth mirror. By picking up the shank of the broach in the shoulder of the mirror handle, the end of the handle may then be touched to the electrode and the current will be penetrating as desired. A tingling sensation will be felt by the patient; this designates proper contact. You will realize that the mirror handle must be metal and with some vulcanite covering where your fingers grasp it. It is expedient to allow a finger to rest on the metal when contact is first established. This takes off part of the current and determines whether the patient feels it, without giving him a jolt with too strong a current. Sensitiveness varies so much that what is strong for one is mild for another. In checking up your technic when all is set and you have not secured the tingling, do not turn on more current until you have tried to make better contact through foramen.



As the dentist makes the connection between the patient and the electrode, in the manner described, he has a delicate control over every phase of the situation.

It is necessary to ground the patient in this operation also. Place the ball-end of a steel instrument against the tissue nearest the apex of the tooth. The operator will then be grounding the patient since in his other hand an insulated instrument permits the flow of the current into the tooth. Sometimes the tingling is not felt until the patient is grounded. This concentration of the current usually enables a mild current to do the work.

About ten minutes application is sufficient for one treatment. It is necessary to move the metal-grounding instrument slowly about to describe an area a little larger than the amount of tissue to be treated. This draws the current through every part (and avoids the possibility of searing any cells by too prolonged a concentration).

Changing the grounding instrument to the other side of the alveolus should be done for half the period of treatment. Alternate days are recommended for further treatment, until all pus has disappeared. Usually two or three appointments are sufficient. When one has become familiar with this technic it is very quickly done, and clears up cases which have had unfavorable histories under other forms of treatment.

Those cases not discharging pus may be treated in the same manner but at longer intervals. Fully three treatments are requisite before filling root, which may be done on the third appointment. Do not confuse the condition of infiltration with that of a granuloma. If the skiagraph shows a definite circumscribed area walled off around the apex, you cannot expect to change that condition with any form of treatment.

Desensitizing dentin is in line for this practice of induction of a medicament by means of the electric current. It has accomplished results where other methods were not possible of use. A pigtail electrode, or plain pointed one, whichever will most readily enter the cavity, is used with a mild current. A saturate solution of cocain is placed in the cavity and the point of the electrode placed into it. It is necessary to ground the patient at the root apex. Some tingling will be felt by the patient. After three minutes' use try slight excavating. As necessary, renew solution and repeat for three minutes, using only mild current, until excavating can be completed.

This cataphoric method has proved of signal benefit in cases of super-sensitive spots of abraded dentin where it is desired to place a filling. A gold-crowned tooth worn through would present such an example. Where gas is contraindicated, induction is likely to solve the problem. Grinding to occlusion in remedying trauma may be facilitated by using this induction.

When necessary to secure an exposure for pulp removal, the cavity usually presents some difficulties. This plan of cataphoresis renders the tooth comfortable enough to permit making the exposure with a bur or excavator for pressure anesthesia.

RADIANT ENERGY

BY DR. A. A. NOUEL, CARACAS, VENEZUELA

(Translated for The Dental Summary by the Author)

THE RADIANT ENERGY with which the sun provides us in the form of light and heat, is the force placed by Nature at the disposal of all animate and inanimate beings for their individual conservation, for their defense, and for the prolongation of the species.

Inert bodies reveal no life apparent to our organs of perception, because we do not as yet comprehend that in their intra-atomic constitution there are evolutions and revolutions of bodies which, according to Fournier d'Albe, are 30,000 times smaller than the ordinary atom of hydrogen, and according to observations by the same authority and by J. J. Thompson and Burdick, they are synchronous with the pulsation of universal harmony; this being the case it is logical to think that they need to nourish themselves so as not to suffer a more or less rapid atomic or intra-atomic disintegration, as would occur to trees which would die if deprived of the element of water, or to animals if not given the necessary sustenance for repairing the waste of combustion.

The laws of synchronous or harmonic vibrations presuppose that the atoms of inert bodies possess the faculty of selecting vibrations, according to the frequency and length of the waves, so that their atoms may harmonically recover the energy lost by specific heat, which, according to electronic laws, is produced by the friction of the free electrons in the atoms which compose simple or compound bodies.

When we increase the emission of electrons in any body by artificial means, there are reasons for supposing that the process of recuperation is set in motion so that they may continue selecting vibrations of frequencies and lengths according to their atomic necessities; otherwise the metal would lose the characteristics of its element and a process of transmutation would result, because according to the modern theory of the structure of matter, there is universal uniformity in its ultimate division; and as Millikan, of the University of Chicago has proved with his classic experiment of the drop of oil, electricity itself is of granular structure.

I think that one of the reasons I may bring forth in favor of this theory is, that when the atoms in metal become stimulated in a rarefied medium, although they emit radiations in accordance with their atomicity, the metal becomes volatilized to a lower temperature than that of its point of fusion and its constitution suffers alterations of cohesion.

A logical explanation of this process of disintegration may be found in the loss of electrons and in the difficulty those metals find themselves in, owing to the medium they are in, of selecting the waves in accordance with their atomic weight or electronic number, for restoring the tonicity of their atoms.

According to Kaye, the degree of volatilization is modified by the nature and temperature of the metal, the nature of the gas in which it is confined, and the pressure of the latter; and that metals of the platinum group disintegrate less in proportion as the pressure is reduced, and that evidently this is not a simple process of volatilization, but the formation of endodermic oxids more volatile than the metal itself, and that in the case of paladium and almost all other metals, the reduction of pressure is favorable to volatilization.

As there is a more or less intimate relation between the atomic weight and the proportion of electrons for each atom, it is possible that this is what establishes with so much uniformity, the unevenness of volatilization according to the difference of atomic weight.

It is very probable that radium, uranium, and other radioactive bodies have a great affinity for waves of different lengths and frequencies, and an immense power of assimilating these to their atoms, so that the radiations continuously emitted by them are not an obstacle to the renewal by their atoms of their electrons almost in their entirety.

I refer to different lengths and frequencies because their electrical manifestations are not homogeneous; which causes me to presume that all the atoms of radium have not the same amount of electrons because of the variety of radiations they emit.

According to data taken from Burdick and Kaye, we see, for example, that the atom of hydrogen is equal in mass to 1,830 electrons and contains 1,000 of these, which unite and form the electric equilibrium, or what is called by chemists, cohesion; the atom of oxygen contains 16,000; and thus following the scale, we see that the atom of platinum contains 149,000.

The results of careful experimental observations cause us to presume that electrolysis in synthesis is nothing more than harmonic manifestation of electrons, determined by the valance of the atoms; and that chemical reactions follow electronic changes in order to maintain the equilibrium of the harmony.

Evidently *catalysis* is an electronic manifestation possessed by many bodies, the mere presence of which is sufficient to change the nature of a chemical substance; and *enzymes* are another form of matter which can produce energy without losing weight or volume. It is to be presumed that it is also an electronic manifestation when the corpuscles or electrons in the presence of certain substances rotate with greater velocity around their positive nucleus, or that with the great velocity they have acquired, they increase their orbit

or detach themselves from their central nucleus. But, as their weight and volume are thousands of times smaller than the atom, it is very possible that their diminution is not noticed, and that the substances which are chemically modified, imprison those electrons in their flight.

It is also possible—and this I leave to the experimenters who possess adequate means for establishing the truth—that this process may be inversely effected.

In order to give greater force to the supposition, I may say that Dr. Rodin, of Paris, in experimentations of corpuscles using alternating current with electrodes of silver, has obtained them in solution, and assures us that they possess very active properties from a therapeutic point of view.¹

May it be that this follows a phenomenon of assimilation or a process of selection of waves or interchange of vibrations?

Thus again and again we may launch forth in pursuit of truth, sometimes in the immense ocean of conjecture, and again by worthy deductions, taking as a basis the efforts of the physical and chemical laboratories, a case of which occurred with the discovery of the theory of electrons, which goes to prove that many logical deductions arrived at by different roads may contribute to the solution of problems apparently unapproachable.

Who discovered this theory which teaches so many intimate things about the profound mystery of microism? Many persons in conjunction and no one in particular.

Assimilation, considered from the chemical point of view, might follow from electronic interchanges; in a physical sense, from selection of waves of different lengths and frequencies; in a biological sense, from the grouping together of atoms and molecules whose harmony only can be explained by their intimate intra-atomic constitution and synchronic vibrations; in a social sense, to the collective harmony of affective, mystic and rational dielectrics; and lastly, in a political sense, to unconscious interchanges of suggestion among individuals and between individuals and associations, when forming a public opinion arising out of some acute circumstance, or perhaps at the appearance of a social element whose power to dominate the masses carries the indelible seal of superiority.

How must we catalog these manifestations which apparently do not all bear scientific character, and which we commonly call phenomena?

When science fails to find an explanation for natural things, for nothing under the sun is supernatural, we are presented with this sad trilogy: Phenomenon, chance, and X, the unknown, with which term the Greek philosophers of antiquity would have perpetuated on the stage of life the ignorance of man at their time and at every future

¹"X-ray and High Frequency in Medicine," by Gordon G. Burdick, M. D.

epoch, and prophesied the probable impossibility of understanding and explaining the unknown causes of so many known effects. Raynal is right in saying: "While experimental philosophy discovers effects, rational philosophy investigates causes."

No wonder that every one of these examples of assimilation should finally find their explanation in the theory of vibrations of waves of different lengths and frequencies, in something of the nature of radiant energy which our laboratories have in some cases proved, while in others, observation and statistics cause the scale of probabilities to incline towards the side of possible and scientifically explicable things.

It has not been my intention, in developing this thesis, to lift myself into spheres so little explored. It is the lure of deductions, that incentive which has so efficaciously stimulated man in all activities of knowledge that has brought me to a point from which it is so difficult for me to descend in order to speak to you of radiant energy in dentistry.

The therapeutic value of radiant light and heat is already well proved, and today their application is becoming more and more general by reason of the surprising results gained in many cases of disease.

Radiant light and heat always are used conjointly when we utilize the lower scale of frequencies and the higher scale of lengths, with the object of improving the local or general metabolism according to the modality we employ.

Much as we feel obliged to interpret the diminution of resistance as lack of tonicity in the cells, this defect should be investigated in the molecules constituted by atoms. At this point we are fully entered into the invisible physical world, and before resuming our talk about the diminution of resistance referred to above, I must pause to make a supposition that the atoms have lost their rhythm through the temporary absence or loss of electrons. Thus, then, we must try to find the means by which the atoms may regain their lost electrons, their normal vibration.

Everything contributes to the supposition that the waves of frequencies and lengths subject to selection by the atoms which cannot administer tonicity to the cells, are to be found in the lower scale of the spectrum, from the orange and red to infra-red, as also in the combined vibrations of the spectrum, deprived of the violet and ultra-violet radiations.

As micro-organisms collect together at points of defective resistance, we ought to employ waves of the highest frequency and of least length to secure their inhibition or destruction. These are the waves obtained in the spectrum from the line beginning at blue and violet and ending at ultra-violet.

The application of radiant light and heat is prescribed for various affections of dental origin, but I wish to consider it only as regards infected parts whose extra-apical regions lack resistance to keep back the invasion and proliferation of micro-organisms.

Into so extremely limited a field it is very difficult to direct a shaft of radiant light so that its vibrations may be diffused in different directions, because the point selected for applying radiant light as well as heat, has necessarily to be the canal of a tooth since it has the advantage of being a cavity which serves as a central starting point for the radiations.

Besides, if we were to employ a shaft of light, our purpose would be either to restore tonicity to the cells, that is, restore normal rhythm to the atoms constituting them, or else to retard the virulence or destroy the vitality of the micro-organisms, because in the first case, we should employ radiations of lower spectral vibrations; and in the second case, the higher radiations of greater frequency and smaller length.

Consequently, in order to obtain those combined radiations we ought to be able to employ a negative modality which can emit waves or radiations from the higher to the lower rays of the spectrum, including the ultra-violet and the infra-red.

The electric discharges produced by a series of transformers which heighten the tension to thousands of volts, appear to produce the required radiant energy; but if it is not modified by means of condensers, its use together with metallic electrodes becomes impossible and impracticable in therapeutics, and for dental purposes its intensity should have a very ample scale, from which point of departure the current should be hardly perceptible, without the sensation of the galvanic nor the faradic current.

The current of high frequency produced by apparatuses whose last winding works by induction, is the one I always have preferred because the patient is not exposed to abrupt changes, nor to the disagreeable sensations of the galvanic and faradic modalities.

On the other hand, the atomic constitution of the tooth stripped of its pulp, places it among the bodies called dielectrics, that is, consisting of atoms and molecules whose electrons rotate in so reduced an orbit around their central nucleus, that only a very small proportion gets detached and wanders through the inter-atomic spaces.

In the condensers, these are the bodies employed to put between the metallic plates, because when these are charged with an electric current, each electron separates a little from its atom, but not sufficiently to be cut off by the neighboring atom. This process is effected on each side of the dielectric, and the corresponding charges acquired by the displacement of their electrons are of inverse direction from those of the current which excites them.

The internal electric camp, if I may use this expression, diminishes noticeably because the electrons become displaced and accumulate on the negative surface corresponding to the positive side of the metallic plate, while on the other side the atoms have proportionately lost part of their electrons, and that surface is charged positively and in a contrary manner from the charge of the metallic plate in intimate contact with it.

Although the current of high frequency is not adequate for charging condensers, it seems to me that the extreme rapidity of their oscillations sets the electrons of the atoms in violent commotion, and that a compensating counter-current is developed, which permits us to employ that energy radiant with thermic, electric, kinetic, and actinic manifestations, without the patient's perceiving the intense heat nor the sensations inherent in the electric current.

Nikola Tesla, with his powerful transformers and spiral coils, has observed that a sheet of tin suspended in the center of a selenoid, gives a violent explosion, that a piece of steel becomes incandescent in a fraction of a minute and liquefies like water; that motors may be synchronized with radiant energy produced by his apparatuses, and quotes many other experiments which make manifest that the atoms in the bodies accept or reject excesses of electric discharges according to their electronic number; but the most wonderful thing about his experiments is that those oscillatory vibrations which work so energetically on metals, are innocuous to man. He explains this phenomenon by considering the body as a condenser having the property of producing an electromotive counterforce which saves it from immediate destruction, and that these waves have a special selective power over the nervous system. May it not be that the latter has the property or faculty of assimilating these oscillations, or of synchronizing them because of the intra-atomic constitution of its cells or the number of electrons in its atoms?

According to the treatise on electric currents in their special chapters on currents of high frequency, our nervous system does not perceive the vibrations when they exceed 10,000 per second.

This means that going beyond a certain number at a given time, there becomes established a harmony or synchronism between the electric oscillations and the vibrations produced by the shock or friction between the electrons which rotate around the atoms constituting the nervous cells.

If, according to Nikola Tesla's theory, the tooth acts as a condenser, it is to be supposed that when we are treating a tooth by introducing a metallic electrode into its canal, its role of dielectric increases progressively, because with the evaporation of the humidity contained in the disintegrated residue in the dentinal tubuli, the dentin improve their dielectric conditions also, which permits us to

prolong the application without manifestations of disagreeable sensations although the sparks push more directly into the interglobular space, as I can prove by photographs taken during an application on an extracted tooth.

The photograph was taken with the tooth over a film folded in a black paper, and during the application, as I have said above, so that it would appear that the blue and violet radiations passed through the tissue of the tooth and the protection of the film, and struck the gelatin of the bromid of silver.

The infra-red radiations cannot impress the photographic plate, because in order to record their presence through an opaque body, it is necessary to take the photograph indirectly, making them operate beforehand over a screen of sulphid of green fluorescent zinc, previously sensitized by solar rays or by X-rays, so as to photograph the impression that is produced on it.

In order to explain how the impression is produced on the photographic plate, it must be agreed that the discharges of the electrode pass through the structure of the tooth and the covering, and that owing to the thickness of the film, the illuminating agent is produced by secondary rays, as in the case of a radiator when a group of X-rays falls perpendicularly on it.

I do not by any means pretend that the blue, violet and ultra-violet rays pass through the entire thickness of the dentin into the interglobular space, but I do think that they have relatively easy access even through one or two millimeters of depth into the dentinal tubuli dilated by the thermic action of the discharges.

As for the rays that affect the plate we must suppose that they are the blue or the violet of the spectrum because the ultra-violet impress it very feebly, and besides, they must be very numerous to resist the extinguishing effect of the infra-red radiations, which, it is almost certain, pass through the entire mass of the tooth as they do with a sheet of ebonite.

I know now that this process will not work absolutely the same way with a tooth implanted into its alveolus, but I can assure you that holding the forefinger in close contact with the patient's gum, he being insulated, the temperature of the gum increases in less than ten minutes to the point of making it almost intolerable to the forefinger, while the patient has no sensation of the local increase or the exceptionally high temperature to which the tooth has been subjected. It is true that there is a great difference in sensibility between the extremities and other parts of the organism, but it seems to me that when to the operator the thermic manifestation is so pronounced, there ought to be produced a rather intense diathermic one in the extra-apical region.

I believe there remains not the slightest doubt of our finding an adequate method of restoring tonicity to debilitated cells, by means

of which the atoms may recuperate their temporarily lost electrons; and that in due time we shall call to arms the defenders of the organism to combat or destroy their invading enemies previously inhibited or debilitated by the action of the secondary radiations, probably produced by the infra-red rays.

It is well to remember that the hyperemia produced by this electric process is of long duration, and that consequently it keeps the phagocytosis in full activity which undoubtedly contributes to the process of regeneration.

A canal treated in this manner is not entirely ready to be obturated and although the nature of this work is to make the most concise exposition possible of the theory of radiant energy, and of what we may hope from its use in our profession, I must say that the dentinal tubuli can be obturated with disinfecting substances, though we may at the same time make use of the kinetic radiant energy produced by the current of high frequency.

Before closing I shall say that I am able to demonstrate in a visible manner the difference existing between a metal and a dielectric according to the electronic theory and the kinetic radiant property of the electric current of high frequency for overcoming the inertia of the body, provided always that it be dielectric.

In reference to this I shall demonstrate objectively that metals do not repel electric waves, they absorb them or assimilate them or their electrons become synchronized, and radiant energy in certain cases, is transformed into thermic energy; while dielectrics act in a very different manner, displacing their electrons according to the polarity of the current which works over its surface, regaining its normal equilibrium as soon as the latter becomes free from the foreign elements, or in excess of the electronic number of its atoms, and that this process is manifested on some occasions by thermic radiations.

Gustave le Bon considers the manifestations of radiant energy a proof of the disintegration of matter, and makes special mention of his classic experiment with the small sheet of aluminum suspended in space which emits radiations of light in the dark. Another of the many proofs brought forth is that with a limited charge of electricity through induction, there may, also through induction, be produced other charges of electricity apparently inexhaustible.

He demonstrates by objective proofs the existence of light in darkness, which seems paradoxical, and shows us that the radiations of the inferior scale of the spectrum, that is, the infra-red, pass through a sheet of ebonite, and that its effect becomes visible over a screen of sulphid of zinc of a green fluorescence.

Why, knowing so well that there are vibrations or waves of different lengths and frequencies subject to selection by different

bodies and in different ways, why does he attribute these manifestations to the dissolution of matter?

It seems to me that these phenomena are produced by the more or less violent emission of electrons temporarily imprisoned, or by the recuperation of electrons temporarily lost; sometimes by artificial means and at other times by phenomena which follow the laws of resonance, the explanation of which we do not thoroughly understand, because the electronic theory is barely at the earliest dawn of its existence, but which we could well interpret by preference as phenomena of synchronism, and place them among the list of manifestations obedient to the laws of universal harmony.

When we produce synchronic vibrations between a diapason and a chord, we feel the resonance which strikes our ears, and we see the oscillatory movement of the chord.

In the experiment with the small sheet of aluminum suspended in space, by means of electricity through induction, the apparent immobility may be the mathematical point in which the electrons of its atoms synchronize their revolutions with the vibrations emitted by the influential body, and the sparks emitted and visible in the dark may be compared to the oscillations of the chord, only the sound given forth is too feeble to impress our auditory organs.

Perhaps I address you in a language rather unfamiliar in our profession, but I am hoping that my ideas on radiant energy which, according to the most modern theories, gives life and heat to animate beings as well as to inanimate bodies, may find a favorable echo in the great laboratories of investigation in which every new manifestation of scientific labor is carefully examined regardless of its author's nationality

CRITIQUE

BY A. J. PACINI, M. D., CHICAGO, ILL.

There seems to be two dominant thoughts propounded by Dr. Nouel; that the living machine is a composite of molecular and atomic structures integrated from the ultimate division of matter—electrons. Then, that radiation energy impinges upon these rapidly moving particles in a fashion to rearrange their speed of vibration; and by so doing re-establishes a normalcy.

Much of the Doctor's conjecture is interestingly speculative and brings back vividly to mind Johnstone's "Mechanism of Life," wherein vitalization is advanced as something present in the living organism and absent in the inorganic thing. This something is as yet unrecognized and is generally denoted "biotic" energy, its function being that of conferring direction upon the energy-transformations that occur in the living organism. Dr. Nouel sees a likeness in animate and inanimate structures, both of which he resolves not only into their ultimate molecules and atoms, but even into their electrons. And the conferring of the direction of the energy-transformation is referred to by this interesting writer as a "synchronism with the pulsation of universal harmony."

There is much to commend in this rather quaint therapeutic thought. It is in complete accord with the modern trend of atomic theories. Yet, while the possibilities of the ultimate correctness of Dr. Nouel's theme are many, it must be said of his hypothesis that it is not entirely free from metaphysical foundation. It was

said of the Greeks that their metaphysic was a profoundly organized science, but their science a confused metaphysic. And what has been said of the Greeks may similarly be remarked of Dr. Nouel's contribution—that his science is a confused metaphysic presented in a pleasantly allegorical style, and highly commendable in that it shakes the complacency of old-established theories and points to a progressive path along the scientific evaluation of the truth.

THE X-RAY AS A USEFUL ADJUNCT IN THE TREATMENT OF PYORRHEA ALVEOLARIS

BY R. R. ROUSH, D.D.S., COLUMBUS, OHIO.

(Written for THE DENTAL SUMMARY)

FROM THE EARLIEST TIME to the beginning of the eighteenth century, the study of oral diseases and their treatment was confined to medicine, but since that time the study of general pathology has been neglected by the dental profession and dental pathology has been neglected by the medical profession. This explains the many unforeseen ills in the development of the mechanical side of dentistry. It is impossible to understand a disease without an intimate knowledge of the relationship of the pathological and clinical manifestation of oral infection on other parts of the body. The mouth being the main avenue to the body, infections should be considered most important.

Too small a percentage of practicing dentists consider anything but the mechanical side of dentistry. Their patients may report with definite symptoms of impaired health and the dentist may repair teeth which sometimes should be removed, or add work, and often he will not even ask the patients if they know the source of their sufferings or say anything about a number of teeth loosened from pyorrhea, or suggest X-ray for the purpose of disclosing periapical abscesses and antrum infection.

The responsibility of oral diseases has been relinquished very largely to the dentists by the medical profession; therefore, it seems quite important that they should be generally informed on this subject. Too many are equipped for mechanical dentistry only, but at least all should realize the importance of referring their patients for thorough diagnosis when in doubt, especially before doing mechanical work. You cannot diagnose and advise from X-ray pictures alone, for you look for abscessed teeth and overlook those with unfilled root canals and discolorations, which often are more dangerous than those with a definite outlined area, and also a superficial infection may involve the whole mouth and not show in the X-ray; therefore, the examination should be made with the pictures at hand.

The principal value of dental service has to do with its bearing on the general health, and we are beginning to understand focal infections and their remote effects on the human body. Oral infection

can only be combatted successfully by skilled dental treatment, and, in order to accomplish good results, it becomes the duty of the dental surgeons to be most thoroughly equipped. The public is becoming educated to realize that normal oral tissues, as well as sound teeth, are essential to good health.

In diagnosing infection of the mouths of doubtful patients, one should consider the tongue, tonsils, pharynx, and sinuses. Thirty-two teeth presenting thirty-two possible avenues of infection, also dentures, bridges, fillings, crowns, and devitalized teeth, as they are especially prone in infection, should be considered. The well-kept mouth may appear healthy, yet be the seat of extensive periapical infections which require X-ray for diagnosis. The size of the area, number of teeth involved, or amount of pus present, bears no relationship to the seriousness of the condition. All old roots and snags are septic, and too often we find them covered with bridgework or even used as abutments.

Systemic diagnosis is made on general clinical symptoms, depending on the organs and tissues involved. The result of appropriate dental treatment is very important, although the failure to improve does not warrant the conclusion that the original infection was not of oral origin. "To indicate the extent of diseased tissue in oral sepsis, if each of the thirty-two alveoli and thirty interdental spaces, through which infection in the adult may occur, had pyorrheal involvement to the depth of one-quarter to one-half inch, which is not uncommon, it would represent an ulcerated surface of seven and one-half square inches."

The X-ray is helpful in diagnosing periapical abscesses, granulomata, cysts, pyorrhea pockets, osteitis, retained roots, pulp stones, unerupted teeth, filling of root canals, sinus diseases, directing dental treatment and following up results. The X-ray will show the minimum rather than the maximum amount of trouble. To minimize errors, it often is necessary to take the films at different angles, considering the thickness of the alveolar processes, the overhanging antrum, and presence of the mental foramen, for these present technical difficulties. The absence of abnormal roentgenographic areas does not mean that the tissues are healthy. Streptococci frequently may be cultivated from extracted roots where the roentgenograph showed little or no evidence of trouble. The size of an abnormal area does not bear any definite relation to its pathological importance, as even a single infected tooth in a susceptible individual may suffice to produce general symptoms, or prolong them if already present.

The most desperate pathological condition confronting the profession today, is pyorrhea alveolaris. In reviewing the literature relative to the work that has been done, it is evident that we lack a thorough understanding of its pathological nature. Remedies, while germicidal in effect, are too damaging to normal tissues. They destroy

the causative factors, but at the same time destroy living tissues to such an extent that nature is unable to produce, heal, and reclaim its productive power against further infection before the germs have an opportunity to gain a new foothold.

I positively think that pyorrhea is a local infection with several predisposing causes, with no specific organism. The predisposing causes may be enumerated as follows:

Infection of gums by toothpicks, or doing dental treatment for which the dentist cannot exercise too great care, rough or ill fittings, mechanical appliances, the use of a rubber dam, or fillings extending under the gums by overlapping or anything producing irritation or local injury to the tissues.

Medicine, escharotics, or gritty dentifrices, etc., neglect of teeth during primary dentition, and early diseases of the gums and caries.

Enlarged tonsils, adenoids, nasal obstruction and other causes of mouth breathing, causing oral deformities and dental irregularities, crowded and imperfect occlusion of teeth, as in these regions you never have a compact process or nature giving a compact covering or protection, which directly allows organism to gain a foothold, and once it enters the cancellous process it is no more self-eliminating than water filtering through cloth, and once it has advanced to this stage it must be treated as osteomyelitis.

There is pus present in all cases, but it is often massaged from the gums or sucked out by the tongue and pressure of the lips; one should look for openings into the processes and not for pus in diagnosing the beginning of a case of pyorrhea.

There is no other disease in mankind where the diagnosis is neglected as it is in pyorrhea. It is often called gingivitis or receding gums until it has completely destroyed the processes.

Take a case of receding gums. First, you must have the process removed by some manner before recession can take place. You will find in the greater percentage of cases you can enter the process without making an abrasion in the gum attachment about the teeth, which causes suppuration. It is necessary to remove the diseased gingival tissue, including a layer of the necrosed process, surgically, just as though you were amputating a suppurative area in any other part of the body.

We have seen instructions "that upon inserting an instrument under the gums to remove the deposits of calculus, to be very gentle about it and not cut too deep, and that you had better cut too carefully than to open tissues to an infection." These instructions are absurd because the processes are infected or there would not be pyorrhea. A layer of necrosed process of from one-thirty-second to one-eighth of an inch must be removed to get to healthy tissue.

My method of cleaning pyorrhea pockets is to eliminate them entirely, because one would not leave pockets on the skin where it

can be cleansed thoroughly, let alone in the mouth where you have an infection which is the best incubator for germs. You cannot have a gum unsupported by process to protect a root and think it will be healthy, any more than you can remove a bone in a finger and let the soft tissues remain and expect it to be useful. The gum, on account of forming a pocket, becomes germ producing at once.

You may ask why some people never use a tooth brush and are free from pyorrhea. Everybody cannot have pyorrhea. They must have a process which is susceptible. It is impossible for necrosis to involve the exceedingly dense process of some mouths. There may be a cancellous process on one side of a tooth or the lamella running parallel with the root, while on the opposite side of the same tooth you will find a compact process or the lamella running horizontally, which is impossible to progress in that form of bone. On one side of the mouth the interproximal may be covered with a layer of compact bone, one-sixteenth of an inch in thickness, while on the opposite side of the mouth there is no barrier whatsoever but the thin covering of mucous membrane over the process of the interproximal and about the neck of the tooth. All that is needed in this kind of structure is a little tartar to make the abrasion and the infection progresses into the process without the body eliminating, while on the opposite side, where nature has provided a real barrier, crowns, fillings, tartar, nor anything else seems to have any effect unless this hard structure is broken down, which requires a great deal of suppuration and probably many years of destruction, which accounts for people who never use a tooth brush being free from pyorrhea. They may have irritants and a most weakened system, but there is a hard structure underneath. In some cases, under the X-ray, you will find a dense process which is not destroyed more than one-third of the supporting structure and the patient may be seventy years of age, while in the other cases you will find loose teeth at the age of thirty. X-ray and compare the bone formation of the two mouths.

You are not treating the diseased condition whatsoever, where massage and instrumentation of the teeth are employed as the method of treatment, but are only removing the product of the disease. Such a method is similar to treating a suppurative appendix by applying medicaments and massage to the abdomen. Rubbing the gums and drying up the pus means nothing whatsoever in eradicating the disease, as it keeps the pus squeezed out and the gums pink, but the patient still has the underlying layer of necrosed process. This method will retard advancement of destruction and keep gums apparently healthy until the process eventually is dissolved and the teeth are lost.

Dieting for the purpose of eradicating pyorrhea is absurd. It is not indicated any more than it would be in a patient where you were to amputate a part of the body to stop a suppurative condition.

Look for the cases of pyorrhea in the younger subjects and do not wait until the teeth are loose; extract all loose teeth as it is impossible to tighten them if they are loose from the destruction of the process. Practically all cases of inflammation of the gums will cause enough abrasion for the germs to gain access to the process, and then it is all a matter of bone formation, especially if it terminates in a typical pyorrhetic destruction of the bone or a compact resistance making it impossible to progress.

I have treated more than five hundred cases which could not be diagnosed as anything but pyorrhea; many others have come for treatment where all the teeth had to be removed because their support was entirely gone, and many cases of inflamed gums which cleared up without doing any curetting as it had not entered the process. The above number includes cases treated six years ago, as well as those under treatment at the present time. I aim to see the older cases about twice a year, and some have not been to my office for a couple of years, and some of them still have the tartar on the surface of the roots without recurrence of the disease. Many patients want only temporary relief, and if you ever find one of my cases where any pyorrhetic condition remains, you know the patient did not stay with me until I dismissed him as cured, because I have the first pus pocket or pyorrhetic condition I could not eradicate.

No one in the world appreciates instrumentation more than myself. It should be applied to young individuals to prevent pyorrhea; polish the teeth to show their exact beauty and to prevent gingival cavities, but in no event should instrumentation cause an abrasion of gum tissues in these cases.

METHOD FOR TREATMENT

I feel that the following method of treatment for pyorrhea is new in many respects, and a rank departure from the old and generally-accepted methods now in use, which are treating the symptoms and not uprooting the disease. Therefore, I ask that you consider the following with an open mind and do not condemn it with only a casual reading:

The requirements are a thorough knowledge of histology and pathology of both the hard and soft tissues of the mouth, and a good understanding of location and extent of pyorrhetic infection in every specific case, which can be determined conjointly by X-ray and general diagnosis. I will state that it is utterly impossible to treat pyorrhea successfully without a good X-ray picture of the entire mouth showing extent of diseased process and bone structure of each particular case—any more than you would expect definite results from treating a skin infection under one's clothing and not exposing the diseased areas.

After this is determined, my next procedure is to allay inflammation, congestion and infection as far as possible before excision of

all unsupported soft tissue and radical curettement of all infected underlying bone structure, I find that the inflammation can best be allayed and sterilization more nearly accomplished by the use of calcium hypochlorite solution, (free from sodium), and therefore non-escharotic and highly astringent. This medicine being applied gives you a much healthier mouth in which to do curettement and all inflammation is relieved and you have only the definite pyorrhetic pockets remaining, and are not so likely to destroy good tissue. I have, in a number of out-of-town patients where I could only see them a few times, begun the radical curettement without the preliminary treatment and find that it is quite painful, and I feel that I must destroy too much good bone to be sure that I get all that is diseased. You must keep them under your observation regularly for some time because the infection in some regions will gain a new foothold. After this is accomplished, it should be compared to gangrenous condition, involving both hard and soft tissue, in any other part of the body, the finger or hand for instance, in which case your surgeon would amputate *enmasse*, making his incision well back into healthy tissue and therefore eradicating the disease and obtaining a healthy scar, which is exactly my method of treating pyorrhea.

It can again be compared to the tree surgeon, who does not spray the trees to eradicate a dead limb or decay of the trunk, but he amputates the limb and with adz and chisels removes all decayed substance of the trunk well into the healthy wood.

Inasmuch as this curettement and excision of the soft tissue will produce some soreness, I suggest this be done over limited areas at a time. After proper excision of soft tissue and curettement, the deposits of calculus will then be entirely exposed on denuded root areas. It forms a great deal of protection to these roots, and if removed gradually will result in an entirely comfortable condition in the exposed areas. As far as the treatment of pyorrhea is directly concerned, it may be left indefinitely.

I maintain that pyorrhea is not a result of systemic infection, but is purely a local manifestation with a local cause, and these facts should be kept in mind constantly during the treatment, and do not waste your time, and the patient's time by tampering with diet, suggestive therapeutics, divine healing, or any fads that have so often popped up in the treatment of this disease, and no medicine alone will ever effect a cure.

You will perceive that my method of the eradication of pyorrhea is both medicinal and surgical, one following the other in logical relation, and this treatment must extend over a period of time because of its being located in a field which is impossible to completely sterilize. It is not miraculous, but purely the result, that a healthy scar in soft tissue is less susceptible to reinfection, and a healthy scar in hard tissue is less susceptible to fracture.

At the beginning of my practice of dentistry, I treated pyorrhea by doing prophylaxis and using the recommended remedies. Not obtaining the desired results, I began studying cases and realized that I was not treating the disease at all, and on April 13th, 1916, I gave my first real pyorrhetic treatment and from that day until the present time I have used my own method and medicine. I have yet to find a single case which will not yield absolutely to the treatment just described, the interproximal spaces completely sealed, the oral cavity more immuned, and the mouth as healthy as one never infected by pyorrhea alveolaris.

131 E. State St.

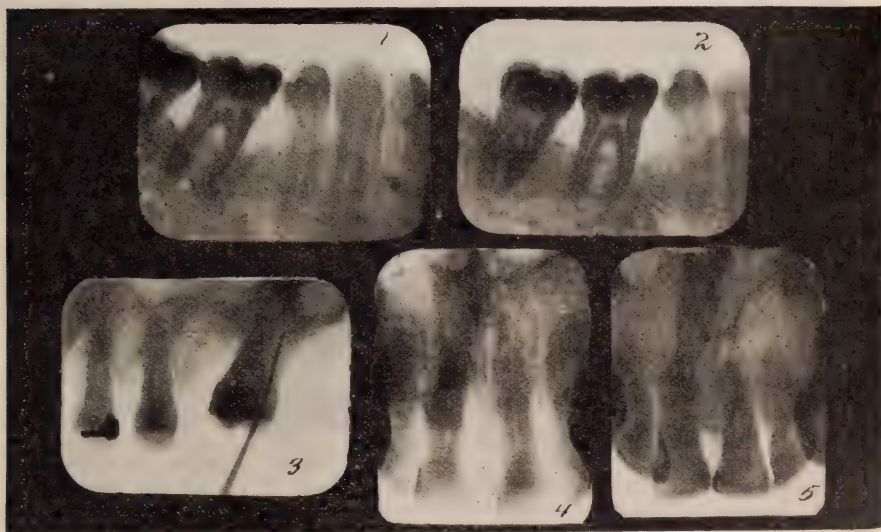


Fig. 1—Case at beginning of treatment.

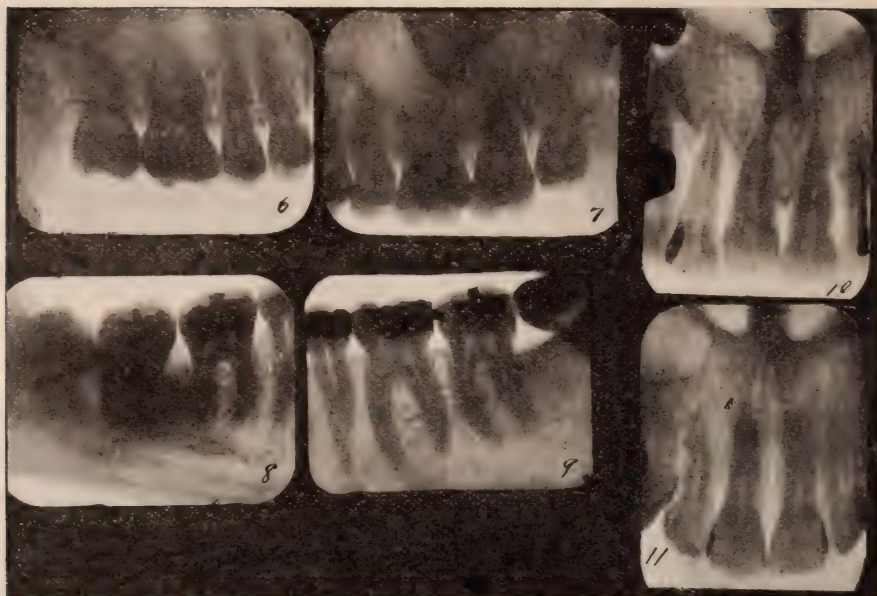
Fig. 2—Same case after four months' treatment. Don't scale the teeth and treat the gums and make your patient and yourself believe you are successfully treating pyorrhea.

Fig. 3—Showing successful treatment in bicuspid region and unsuccessful about the molar region—failed to completely remove all necrotic process in molar region so have no compact layer as you can see I have produced around the bicuspids. After a course of treatment another X-ray is indicated to show bone scar the same as will show in bone fracture case and the disease will recur if it isn't produced.

Fig. 4—Showing upper anterior region of patient 26 years of age. Note the exceptionally cancellous bone formation, size of lacunae and the lamellae extending parallel with roots of the teeth. This is most difficult type of case to affect a cure and the X-ray usually shows it a family characteristic.

Fig. 5—Showing corresponding region as shown in Fig. 4, of patient 72 years of age who never brushed his teeth and had a badly-infected mouth but was only superficial. Note the dense bone formation and nowhere in his mouth has pyorrhea progressed to more than one-fourth of root lengths. This is type of case where they need not cleanse their mouth and never lose their teeth, and is the easiest form to treat.

Figs. 6, 7, 8, 9 are the upper left, upper right, lower left and lower right bicuspid and molar regions of the same mouth, showing two kinds of bone formation in opposite sides and of same side of an individual's mouth. A very dense or compact formation of upper right and lower left but showing a definite pyorrhetic condition, probably all on account of not having the initial dense barrier. All that is required in this kind of formation, is tartar to make the abrasion, and infection enters the process but



progresses slowly. In the upper left and lower right, note the dense layer of bone forming a barrier in the interproximal spaces and the underlying process is of more cancellous formation than above and more readily destroyed by infection if it once gains entrance. If these dense layers are ever broken it is nearly always by fillings and crowns—seldom by tartar. You cannot be too cautious in doing fillings and crowns so as to not make abrasions into the bone tissue.

Compare Figs. 10 and 11.

Fig. 10—Is of a patient 42 years of age. Showing a dense bone layer about one-eighth of an inch in thickness in interproximal of central incisors, while pyorrhea progressed over the remainder of the mouth.

Fig. 11—Picture of a case 24 years of age showing pyorrhea in corresponding region, progressed to more than half the length of the roots and the cancellous formation extends beyond the ends of the roots. Pyorrhea is never cured unless treated with an X-ray at hand, for these pockets are seldom detected and will make their appearance as a recurrence of the disease.

THE CUSTER ELECTRO-CENTRIFUGAL CASTING
APPLIANCE*

BY L. E. CUSTER, D. D. S., DAYTON, OHIO

UP TO THE PRESENT TIME, there has been no device which gives uniform results in casting. It has been found that to be uniformly successful, three things are necessary, namely:

1. The investment should be dried and raised to a predetermined heat.
2. The gold should be liquid and so hot that it does not solidify until the mold is filled; and.
3. The casting force should always be the same.

It has been found that a hot mold is better than a cold one; and on further investigation it was found that the most practical heat was one which was as high as the investment would stand without disintegration. By the old methods of burning out the wax over a flame or on a tray, the heat of the flask was always a matter of guesswork. In the Custer appliance, the flask is placed in the electric oven where it may remain for any length of time. The heat reaches its height in twenty minutes and stands at that indefinitely. This property of electrical heat is familiar to everybody. If the investment was thoroughly set, a filling may be cast in twenty minutes or any time thereafter. In this way, the proper heat of the investment is assured.

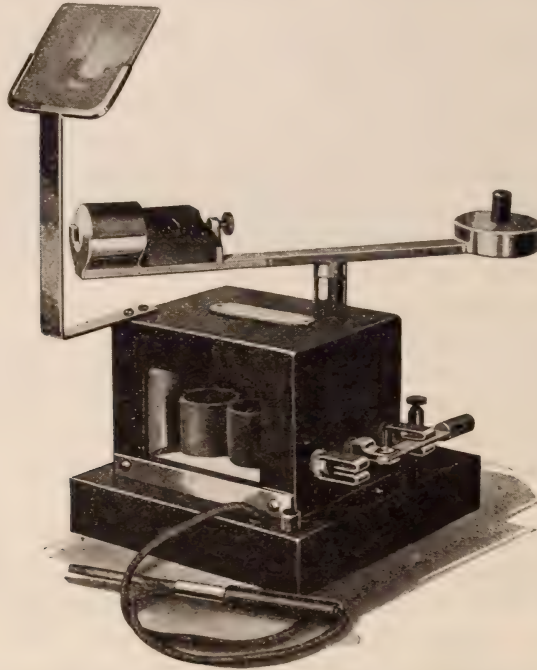
The next essential is bringing the gold to its highest possible heat. Gold melts at 2012 degrees Fahrenheit, which requires a high heat to begin with so that an ordinary blowpipe does not meet the requirements. Doctor Taggart recognized this early in his experiments, for he used the oxyhydrogen blowpipe at the very outset. This gives a heat of 5072 degrees Fahrenheit. Following Doctor Taggart, I recognized the greater advantage of the electric arc for the purpose. This gives a still higher heat, 6330 degrees Fahrenheit, and I put out an appliance in the early days using the electric arc to melt the gold. In the new appliance which is here presented, the electric arc also furnishes the heat. It is so intense that 3dwts. of pure gold can be melted in a few seconds and brought to its vaporizing point in a few seconds more. Platinum can be readily melted in it.

If now the gold is melted by the electric arc and brought to its vaporizing point, the second condition will always be uniform.

The third essential is a uniform casting force. It was early learned that all appliances operated by compressed air or by suction were always subject to leakage which was the most frequent cause

of failure. We do away with air and use centrifugal force which is always constantly proportional to the weight and speed. Through a long series of experiments varying these two factors, we have an instrument which gives a uniform and proper casting force. The gold first enters the mold at its highest speed. The mechanism is such that the initial speed is just right to fill the mold and the pressure is kept up for some seconds after the gold has solidified.

This new appliance is unique in every way. The base contains the centrifugal mechanism, and on top of this is placed a real electric oven of which the writer was the original inventor years ago. This



is wound with a special wire that melts near 3000 degrees Fahrenheit. Since only about 500 degrees Fahrenheit are required it is so wound, and thus there is a margin of about 2500 degrees for safety. Moreover, it is so wound that it cannot go beyond the 500 degrees. In that way, the life of the oven part is assured. This in operation takes but 3 amperes. The most unique part of the device, however, lies in making the wiring of the oven act as a resistance for the electric arc when the gold is to be melted. The wiring is so arranged that by throwing the switch lever in the other contact, a current of 12 amperes is now available for the arc.

OPERATION

The oven part is large enough to contain four flasks if necessary. The current is turned on by placing the knife of the switch in the

front contact. When it is ready to cast, the knife is placed in the rear contact where the proper combination is made to give the arc. The centrifugal mechanism is wound up by turning the lever around about twelve turns from right to left and stopped just in front of the blue glass screen. The flask is placed in the arm and the carbon crucible in front of it as shown in the illustration. Then with the free carbon electrode, the gold is touched and the carbon withdrawn about one-fourth inch when an arc will be formed upon the gold which quickly melts; and when it appears to boil, a button at the front corner is pressed down and held for a few seconds. This releases the casting arm which revolves until the gold has solidified.

TO CONNECT

The gold melts more quickly if it is the -- -- pole. The two binding posts are marked + and —. Dip the two inleading wires in a glass of water; bubbles will form in greater quantity on the — terminal. Place this terminal in the — binding post.

The arc light for melting gold can be used on 110 V Direct Current only; otherwise blowpipe must be used.

SILVER NITRATE

At the present time we know of but one medicament that may be depended upon to inhibit dental caries. Nearly a century ago it was observed that silver nitrate applied to carious teeth arrests the disease. It has since been extensively used for treatment of both temporary and permanent teeth. The ammonical solutions as first suggested by Dr. Howe are more readily reduced and are applicable in most cases where the nitrate was formerly used. Either of these solutions practically stops the progress of caries. It has made possible the arrest of caries in inaccessible areas of posterior teeth. Large cavities of molars that are sensitive may be treated with silver solutions and reduced with suitable agents without removing every particle of affected dentin. The more recent pulp cappings usually include silver for this purpose.

—U. G. Roberts, *Dominion Dental Journal*.

MEDICAL AND SURGICAL TREATMENT OF
DEVITALIZED TEETH*

BY G. P. BANNISTER, D.D.S., CLEVELAND, OHIO

IN THE EARLY PERIOD of modern root-canal surgery our histopathologist told us that time, together with a careful record of each case, would tell if it would be possible to retain pulpless teeth without injury to the health of the patient.

The passing of two years is not sufficient time to warrant one to make definite statements as to results obtained, at least lasting results; however, our apparent success in the retention of the greater percentage of pulpless teeth by medication and surgery when indicated, and by such treatment as the elimination of such systemic manifestations as ecthyma, the urticarias, the popular rashes, multiple abscesses as well as the more common lesions, arthritis, neuritis and nephritis and myalgia, leads us to believe that thousands and thousands of teeth have been wantonly extracted. Many of those who have been so radical in demanding that all pulpless teeth be extracted have indeed a very narrow vision; they have apparently overlooked the possibility of foci located other than in the oral cavity; in fact many have failed to realize that infection is possible from pyorrhea.

Periapical lesions are not the only ones that fail to show localizing indications. The tonsils, nose, sinuses, gall-bladder, biliary tract and bronchi must be examined; there may be multiple foci; therefore it is not safe to conclude that a focus when found is the responsible one. The removal of a periapical infection may increase the resistance, but certainly it will not effect a cure if multiple foci are present.

We have been promised a cure for all the ills man has fallen heir to, by the extraction of what the laity, as well as many of dental and medical profession call, "dead teeth." This phrase, "dead teeth" has, like the X-ray operated by the so-called diagnostician, been greatly overworked. We have not displayed a sane and well-balanced judgment; little serious thought has been given to histology and pathology.

We have become forgetful of our histology, failing to remember that by the loss of the pulp, the tooth loses only its sensory function, affecting only the dentin. The nutrition of the tooth is supplied by the peridental membrane whose fibers penetrate the cementum, and the cementum is laid down on the outer surface of the dentin after it is formed, and it is formed by cells which are nourished from the peridental membrane.

*Read before the Ohio State Dental Society, Dec. 1921.

The theory has been advanced by some, that infection may result from bacteria passing from the pulp canals through the tubuli into the cementum and peridental membrane, there to be taken up by the lymphatic system of the peridental membrane. According to Noyes we have no evidence that such is possible.

Hopewell-Smith is very definite in stating that such is impossible due to a homogeneous layer of dentin, an extremely narrow layer of solid material, which intervenes between the granular layer of Tomes and the cementum.

We have too often followed the advice of the physician, failing to realize that a very large percentage of the medical profession does not appreciate the necessity of, or, they are not competent to make, a rigid and thorough physical examination. A radiogram showing a translucent area, if near the apex is always a "pus pocket" with them.

The anterior palatin canal, the mental foramen, and a granuloma look the same to them when viewing a radiogram, and on such evidence they send the patient to an exodontist who feels duty-bound to execute the order of the physician. This is an arbitrary assumption of authority which the physician has no moral right to claim, and the only excuse he can offer is his total ignorance of modern dentistry, the resources available for elimination of oral infection by other means than extraction.

I would not have you believe that we attempt to save all pulpless teeth. Our success we believe depends largely upon realizing the limitation of our ability with the present known methods of treatment.

During my association of more than two years with Dr. Weaver, we have treated many teeth of patients with systemic involvements, the majority of which were referred to us after all other possible source of infection had been eliminated. So far as was possible to tell by a very thorough examination, gingival or periapical infection were the only remaining source of *possible infection*.

The first step in the handling of such cases is the making of radiograms that will reveal the true condition of the teeth and supporting structures, so far as it is possible to reveal them with an X-ray. The popular saying that an "X-ray will not lie", may be true, but the wrong angle will certainly distort the true conditions. Oral radiography has been a curse as well as a blessing. The so-called diagnosis given the laity by many of the charlatans who operate a radiographic laboratory solely for mercenary motives have caused untold harm; yet on the other hand an interpretable radiogram is fundamental, if we are familiar with the anatomic structures and deviations when used in co-relation with the clinical findings, symptoms and case history, all of which are necessary if we are to render intelligent service.

Those who demand the extraction of all pulpless teeth are not the scientific and thinking members of the profession. To them the profession has made no advancement since the advent of the turn-key; thorough mastication is of no importance; laws of biology are nil. They cannot remove a granuloma and replace it with new bone as they would remove decay from a tooth and replace it with a gold inlay. They cannot adapt themselves to the principle of meeting the vital conditions in pulp-canal surgery and peacefully await the restoration of normal arrangement. To them periapical tissue will not react in accordance with the laws of health.

Their ideal is a replacement of teeth extracted with a so-called fixed bridge, using gold crowns as attachments which most often remain a source of constant irritation and infection.

They fail to realize that such practice in the end is far more dangerous to the patient, resistance has been lowered through improper mastication and pyorrhea is rapidly developing, the result of irritation and infection.

We have humbly admitted failure of operations in the past. Being unable to bury our mistakes, we have accepted the entire burden of effort for the recovery of the patient, placed many times arbitrarily by the physician. Happily this condition is changing, records are being compared, both the dentist and physician are accepting their share of the responsibility; neither can be fully successful without the diligent co-operation of the other.

In the early years of our profession our efforts were solely directed in saving teeth, believing thereby we were lengthening the life of the patient. Since metastatic infection has been associated with the teeth it has been popular to extract teeth with the belief that we were aiding in life extension. As a profession we have given more thought to restorations that were pleasing to the eye of the patient; even today there are some who are building their restorations on poor foundations. Our operations have been mechanical; we have avoided root-canal surgery and prophylaxis because our patients did not appreciate such work and we failed to educate them to its necessity.

Today is the day of prevention; let us hope in the not distant future, oral hygiene will have advanced to the place where pulp removal and root filling will not be necessary. Until that time arrives, there will be a vast amount of this work to be done if we do our full duty. Never has there been a time when our patients appreciate it more and realize the importance of it being done thoroughly.

I do not believe it is beyond the limitations of our attainments to remove a pulp from the large percentage of teeth, place a root filling and have it remain free from apical infection, thereby preserving the tooth for many years of service. Neither do we believe because

a tooth is pulpless it should be condemned to extraction. We do treat all such teeth as having infected canals and we depend largely on the removal of such infection by the chemico-mechanical action of phenol sulphonic acid, and sodium bicarbonate. This is followed with seventy per cent. alcohol which is later dehydrated and chlorazene sealed in the canals.

We do not consider it necessary to remove a tooth with slight periapical destruction, provided its location will permit of curettage or resection and curettage.

If you have studied the recent articles by Hess you will agree with us that it is necessary to use the Callahan method of filling the canals. We have modified it slightly. After the rosin and chloroform solution has been placed and we have generated the chloro-percha by the pumping method, we place the first piece of gutta-percha point by measurement, remove the surplus chloro-percha, then with a warm instrument condense the point, thus avoiding the excessive overfilling of the canal. Where curettage is to follow, this care is not so important.

In closing I urge you to consider the future health of the patient, the relationship of thorough mastication and oral hygiene, to good health.

Be sure that, so far as is possible to tell, all other sources of infection have been removed, and remember that by loss of the pulp, after the dentin has formed, the loss of the sensory function does not affect the vitality of the cementum. We are not rendering the service of which we are capable, if we extract teeth because they are pulpless.

It is with this thought in mind that I am presenting this short paper. I will show illustrations and give a brief case history of a few of the cases, that have received treatment in the office of Dr. S. Marshall Weaver, covering a period of two years. You may be the judge as to the success or failure of a purely clinical presentation.

Mrs. R., aged fifty-four. I am showing this case that you may see the small amount of infection required to overbalance the resistance of the patient and cause systemic involvement. She suffered from very severe sciatica, so severe the patient was unable to lie down. This is the lateral. (*Fig. 1*). Pyorrhea destroyed attachment as shown. There was a bridge from the lateral on one side to the cuspid on the other. (*Fig. 2*). In less than ten days after the extraction of the lateral incisor, recovery was complete. There has been no return after a lapse of more than two years. I saw this patient yesterday.

Fig. 3—The cuspid after it was treated and the root filled. That was a case where we got the same result as if we had extracted all the teeth in her head. Here we retained the two pulpless teeth and have had no return of systemic manifestations.

Mrs. D—A typical case of root canal fillings of a few years ago. The mouth contained ten teeth with faulty root fillings and one with putrescent pulp. Of this number one tooth was extracted, the remaining nine were treated and curetted. The patient presented



with marked debility, anemic condition and severe headaches. Since the treatment was completed the patient has gained thirteen pounds and the headaches have completely disappeared. One lower cuspid was resected. (Fig. 6). There was very bad destruction.

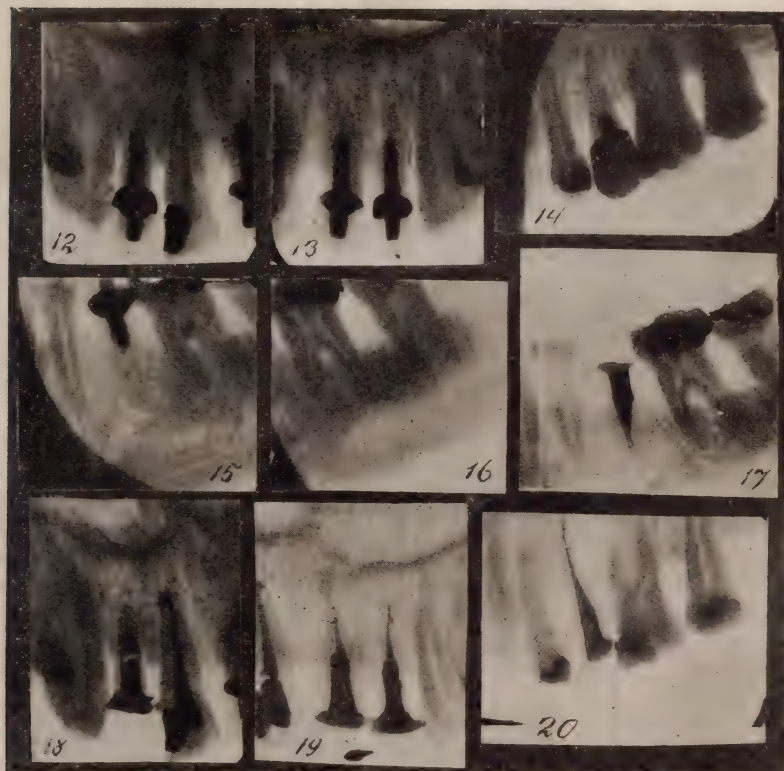
(Fig. 4). After the root was filled. (Fig. 5). Nine months after the resection, it showed the regeneration of the bone. (Fig. 7).

Fig. 8—The case of a central. Same patient—it looked in the X-ray as if the lateral were involved, but upon testing it was found vital.

Fig. 9—Excessive root filling. I think we have overcome this now, however, with curettage; it can be removed.

Fig. 10—Shows regeneration of bone.

Fig. 11—Is upper central eleven months later.



Mrs. E—We have treated a number of cases of which this is typical, affected with dermatitis. Six of the teeth contained faulty root fillings, (Figs. 5-12-13-14-15-16), and there was considerable gingival destruction. In all of these cases where there is pyorrhea involvement, we treat that first, and in this case the rash disappeared soon after suppuration of the gingiva ceased.

Fig. 17—This crown was removed, and the tooth treated and root filled.

Figs. 18-19—This excess is not what we are striving for and not what we are getting today. We have been able to eliminate it in most cases

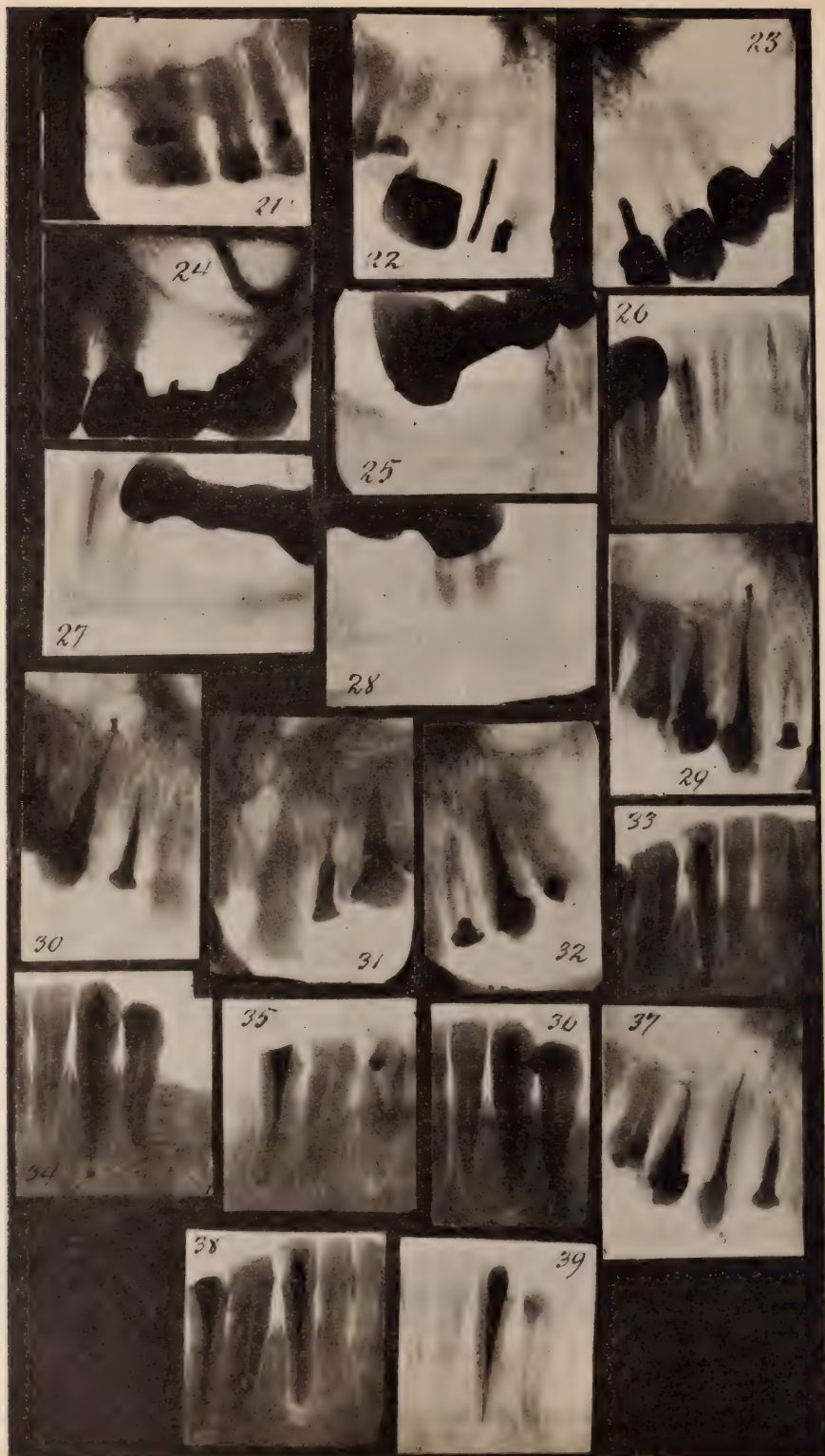
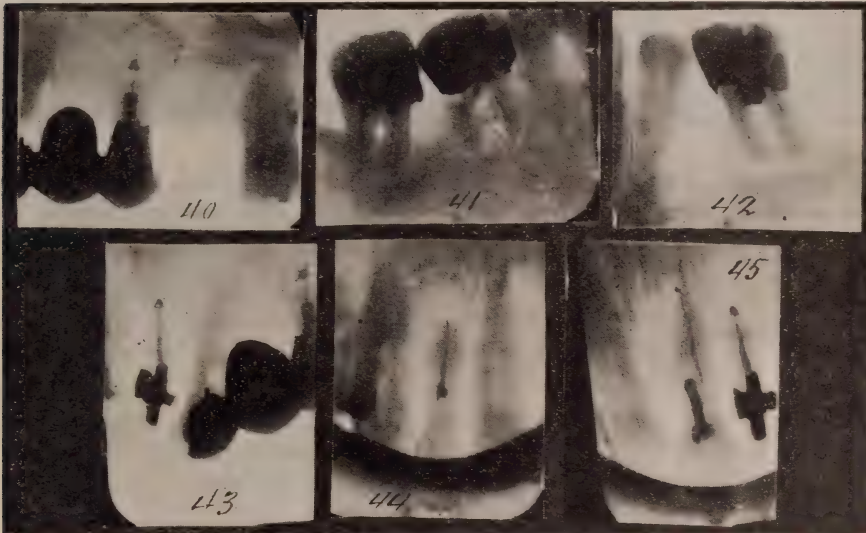


Fig. 20—Bicuspid. The crown was removed and the root filled.

Mrs. F—This mouth contained several stationary bridges with gold crowns serving as attachments. (*Figs. 21 to 28*). These were ill-fitting, and the gingival tissue was highly inflamed and suppurating. The patient had that "tired feeling," together with daily, severe headaches. The bridges were removed. Six teeth with faulty root fillings were treated and filled, and three areas were curetted. (*Figs. 29-30-32-33-34* show the root fillings). *Figs. 35-36* show where we failed on first attempt to fill roots. *Figs. 37-38-39* show result of curettage. The headaches have completely disappeared, and the patient has gained in weight rapidly despite her poor opportunity for masticating.



Mr. G—In this case the dentist tried to retain the teeth to the detriment of the patient. These teeth were badly involved with pyorrhea.

These pictures show the result of pyorrhea. I believe the dentist here considered the teeth paramount to the general health of the patient. This man was having a regular examination twice a year by his physician; the physician never suspected the teeth when arthritis developed; four teeth were extracted. (*Figs. 40-41-42*). Prophylactic treatments were given and the arthritis disappeared.

In one tooth the pulp was exposed. (*Fig. 43*). It was removed and root was filled. *Figs. 44-45* show lack of proper condensation of root fillings.

Mrs. H—A lady about 62 years of age, suffering with multiple furuncles and vertigo. Treatment of furuncles extend over period of about eighteen months by different physicians without effect. Vertigo

was attributed to age of patient. Several teeth badly affected with pyorrhea necessitating extraction; copious flow of pus with very foul odor. Several teeth were extracted. *Figs. 46-47-48-49* were treated



for pyorrhea. *Fig. 50* was treated and root filled. The vertigo disappeared with the pyorrhea—furuncles disappeared about two months later. No dental treatment suggested by physicians.

STUNTS*

BY T. T. BRAND, D.D.S., URBANA, OHIO

THE FIRST STUNT is to make a porcelain jacket crown without baking any porcelain. The crown has a good appearance, is strong, will not irritate the gum tissue, and with a little practice the whole operation can be completed in a couple of hours.

For purposes of illustration we will use peg laterals which are ideal cases for porcelain jacket crowns.

With a lightning disc go into the approximal space—a lightning disc for three reasons: (1) It does its work quickly; (2) being safe-sided, it will not injure the adjoining teeth, and (3) by using a little pressure you can make a nice smooth cut, tapering it toward the incisal. A word of caution in using a lightning disc: Brace the middle finger of the hand holding the handpiece firmly against the adjoining teeth, because, if the disc should catch and get away from you, it may cut deeply into the soft tissues; and another caution, make your cut with a make-and-break contact to avoid over-heating.

With a small carborundum stone, shorten the tooth as much as possible without encroaching too closely on the pulp. It is well to keep the pulpal location firmly established in your mind by the aid of a radiograph. Now taper the tooth all around toward the incisal making the largest circumference of the tooth at the gum line. Thus far the preparation is just the same as for a gold shell crown.

Take a wire measurement of the tooth just under the free margin of the gum. Select a detachable post crown of the desired shape and color, being careful that the neck of the crown is just a trifle larger than your wire measurement. Lay the crown aside for future reference.

Now we come to forming the shoulder on the preparation, and if any of you have had trouble forming a nice smooth shoulder of uniform depth and just under the free margin of the gum, for your jacket crown preparations, try this stunt. Select a good sharp wheel bur. The distance from the shank of the bur to the outer circumference of the wheel will determine the depth of your shoulder—the larger the bur the deeper the shoulder. This being a small tooth, we use a small wheel bur. Make a gum retractor by taking an old hoe-shaped scaler, and cut the blade down as thin as possible without destroying its stiffness. Hold this retractor in the left hand. Go to the side of the tooth farthest away from you, and gently pull the gum back away from the neck of the tooth. Hold your hand-

*Report of a talk at The Ohio State Dental Society, December, 1921.

piece with the thumb firmly braced against the adjoining teeth, placing your bur as close to the retractor as possible; make a cut until the shank of the bur hits the tooth structure. With a pulling motion cut a groove across the labial face of the tooth, retracting the gum as you go, and keeping the bur as close to the retractor as possible, the shank of the bur touching the tooth structure determining the depth of the groove. Extend this groove into the interdental spaces as far as possible.

Lay aside your hoe-shaped retractor, and take a hatchet-shaped excavator. Use this as a gum retractor on the lingual and with the same precaution cut a groove on the lingual side just under the free margin of the gum. If you cannot unite the labial and lingual grooves in the interdental spaces with the wheel bur without injuring the adjoining teeth, unite them with a small bud-bur. Now you have a groove just under the free margin of the gum, and of uniform depth, clear around the tooth. With small carborundum stones cut the tooth down all around to the depth of that groove. The upper margin of the groove then becomes the shoulder of your preparation. The shoulder being under the free margin of the gum does not show.

Now make a stiff paste out of carborundum powder and oil. Take up the crown you have already selected, fill the post hole with this paste, and with a carborundum stone slightly larger than the hole, enlarge that hole to its entire depth. Fill this hole with the carborundum paste and enlarge again. In this manner keep on enlarging the hole until it will easily accommodate the prepared tooth.

In grinding the hole, make the labial margin of the crown as thin as possible. When you place the crown on the tooth in the mouth, you will find that the approximal and lingual margins of the crown will strike the shoulder on the tooth before the labial margin does. With a carborundum stone cut down the approximal and lingual margins of the crown until you can fit the labial margin just under the gum. The approximal and lingual margins of the crown do not want to come quite to the gum line.

Place the crown on the tooth, hold in alignment with the other teeth, and have patient bite. If they strike lingually, grind the lingual to correct occlusion. Oil the hole in the crown with equal parts of glycerin and castor oil, and fill with softened inlay wax. Push to place on the tooth. The wax will ooze out all around at the gum line. Hold it in alignment, have patient bite, and with the teeth closed, chill the wax. Cut away excess wax, and carve to a flush joint between the shoulder on the tooth and the margin of the crown.

The crown pushed to place with the wax in, note the wax oozing out at the gum line. As I said before cut off excess wax and carve to a flush joint. Grasp the crown with thumb and forefinger and

pull it off. The wax core will come away with the crown. With an exploring point tease the wax core out of the crown.

Mount it, invest, and cast in gold, and we have a gold core instead of a wax one.

¶ Treat this gold core as you would an inlay, and fit it into the crown. Then fit the gold core onto the tooth, being sure in both cases that you have tight flush joints. Cement the gold core into the crown, and with the same mix of cement, cement the whole thing onto the tooth.

Here's another stunt. Matching the color of a porcelain or synthetic filling in a devitalized tooth that is off color. Select your color as usual, and place the powder and liquid on the slab. Take your spatula, go to the window-sill and pick up a tiny speck of soot, or if there is no soot there, get a tiny speck off the bottom of the vessel you soften your compound in. Incorporate that soot thoroughly in your liquid. Make your mix as you generally do, and place in the tooth. You will be pleased with the result, and I can assure you that little speck of soot will not interfere with the permanency of the filling.

Another stunt. Putting a Carmichael attachment on a short, pointed cuspid, where you cannot get parallel grooves, or placing an inlay half-crown on some of those lower bell-shaped bicuspid that have no lingual cusp. Those cases that stay for a short time, and then the bridge becomes loose. Try this one. Make up your bridge as though you thought it was going to stay, but before you cement it on, with a small bud-bur drill a small hole through the back of the attachment or inlay you have your doubts about.

Place the bridge in the mouth. Then with the same bur or one of the same size in your contra-angle hand-piece, insert it in that hole, and sink a pit in the tooth, being careful not to go too close to the pulp. It need not be very deep. Take a gold wire the same size as that hole, insert it, and drive it home. You cannot pull that bridge off. Take out your wire. Cement your bridge on as usual, introducing cement into this hole and pit with a smooth broach. Put in your wire, drive home with a few light taps, and after the cement hardens, cut off the wire and polish to a smooth surface.

PRESCRIPTION WRITING
BEING A STUDY OF ITS DEVELOPMENT THROUGH THE
AGES, NOTING ITS SIMILARITIES AND DIFFERENCES
DOWN TO THE PRESENT TIME*

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IN PRESENTING THIS PAPER to the Ohio State Dental Society, it is with a hope or ambition that by so doing a closer union may be inspired between general medicine and that of dental medicine.

The assumption of knowing all or even much about the subject of the paper, is denied by the author, and "standing in the pause," where he shall begin, in the words of the poet, he satisfies himself, temporarily at least, with now and then finding a smoother pebble or prettier shell, while the whole ocean of truth lies undiscovered before him.

With fears and trepidations we essay the task of entertaining, and perchance edifying you on a topic so universally neglected and yet so urgently essential in your upward climb in the scientific world. Never before have I craved more earnestly or sincerely the gift of eloquence than on this occasion when my words will or should influence the actions of many who assume the mighty and solemn responsibility of administering healing drugs to diseased humanity.

With your condescending indulgence then, let us begin our study with some scenes thrown upon the screen, in order that our basis may be well taken, and then tracing the thread of medication down hastily through the ages to our own time, deduce conclusions whether we are competent therapists and whether we are really what we claim.

Historians tell us that "the world has made no progress in architecture, sculpture or painting, and it is with the same condemnation that they view poetry, the drama and music. With this acknowledged lack of progress so evident in other human endeavors, would it be presumptuous to claim that the medical art of today records the most advanced position in its history?"

As we stand today on the rim of the world and look back over the aspirations and attainments of the past, have we really made progress? Let us view some of the facts.

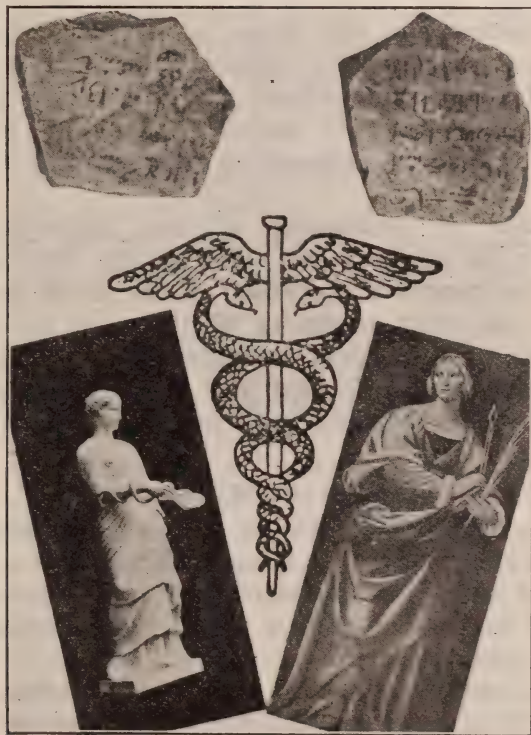
My idea is to take illustrations from different periods and show similarities and differences down to the present time. In it all we

*Read before the Ohio State Dental Society December, 1921.

may not see such evidences as we might expect or covet, but instead find a refutation of the evolutionary idea of progress. A close analysis of human activity as we trace it through history does not show any marked differences, even though separated by world distances and centuries of years.

THE CADUCEUS

This insignia, which adorns the medical officer's uniform, was introduced in 1902, as a badge of neutrality, appropriate to the medical officer as a non-combatant. Prior to this time the insignia on the medical officers' uniform in America was the Maltese cross with scalloped edges. Even today we see the Maltese cross in green color as a medical insignia, and the Maltese cross in lavender color as a dental insignia.



Top, right and left: Oldest prescription Known
Center: The Caduceus
Lower left: Hygieia, Goddess of Health
Lower right: St. Appollonia—The Patron Saint of Dentistry.

Today, the world over, this insignia is worn by medical non-combatants, and during the late war was surmounted by a gold D, denoting the dental branch of the medical service.

The history of the insignia antedates the time it was adopted as a badge of neutrality. As a mythological symbol it goes farther

back than the culture of Hellas. Ward, in his treatment on "Seal Cylinders of Western Asia" traces the Babylonian caduceus back to 3500 to 4000 B. C.

Lexicographers tell us caduceus is a Latin adoption of the Doric-Greek and means "a herald's wand."

The modern caduceus consists of a slender rod of white metal, probably representing quicksilver (Mercury). This rod is entwined for its greater length by two serpents, the heads of which are uppermost and facing each other; attached to the upper end of the rod are two expanded wings.

This rod is generally spoken of as Mercury's wand; but since the normal occupation of Mercury was trade and thieving, neither of which has any close affinity to the healing art, is it not more probable that it is really the staff of Aesculapius? This staff of Aesculapius is a rough wooden staff entwined by a serpent, the head uppermost. The story connected with this device is that when Aesculapius was sitting in a tent examining his patient Glaucus, a serpent crawling in, ascended the staff and imbued the physician with wisdom, of which virtue the serpent is supposed to be an emblem. The roughness of the staff is supposed to represent the roughness of a doctor's life.

Homer speaks of Aesculapius as the "blameless physician"; in later legends he becomes the "God of the Healing Art".

Time will not permit a discussion of the many possibilities and probabilities of the exact origin, or whether it is not a composit of both. Suffice to say the *serpent* was regarded as an emblem of wisdom, *wings* as swift messengers of good, and *wands* as emblems of hidden powers, and now the caduceus is an appropriate insignia of healing art.

HYGEIA—THE GODDESS OF HEALTH

The ancients regarded Hygeia as the personification of physical and mental health. She was associated with Asklepius in the temple of healing, and cared for the sacred serpents which she fed with loving care. You see her with a serpent entwined about her arm and feeding it from a patera.

This young, beautiful, dignified and graceful woman was regarded as the handmaid of medicine and was worshipped in the Asklepiian temples at Argos, Athens, and Corinth, and was revered as the feminine embodiment of all that was gentle and soothing in the healing art.

These two pictures tend to show the great importance with which health had gripped the attention of peoples in very early times.

In the Metropolitan Museum of New York, in the Department of Egyptology, you can find what is perhaps the oldest prescription known to man.

THE OLDEST PRESCRIPTION

The date of the prescription here shown on this stone, which shows both obverse and reverse sides, is probably near that of Eber's papyrus.

The writing was done with a brush. Pens were not invented until about a century before Christ.

The material used as ink was likely pure carbon.

The prescription is about 3500 years old. The writing is the old cursive or hieratic which followed the hieroglyphic.

There are no abbreviations as was commonly used, thus attesting to the fact that it was to be carried a long way, and they wanted it preserved.

The prescription was to be used for a fumigation which was common at that time.

It calls for a precious green stone, which was to be ground up and then burned with the production of smoke, which smoke produced the medical effects upon the patient.

This seems significant, since the disease was a functional nervous one or hysteria. Thus the ancients made use of suggestion 3500 years ago.

These green stones were regarded as almost specific for functional neurotic symptoms, and three kinds were employed. For the wealthy, an expensive one, probably the emerald; for the middle class, one less expensive, perhaps some form of the chrysoprase, and for the poorer the ordinary malachite.

Humanity has not changed much in all these years, since we find today the common remedies that cure the common people are not tolerated by the wealthy classes, but they must have the most extraordinary medicines and treatment.

Nor was there a paucity of therapeutic agents at this time for Eber's papyrus mentions about 700 different substances used as medicines, drawn from the same three kingdoms, the animal, vegetable and mineral, and divided into 40 different classes of drugs, dependent upon their therapeutic uses, and used for various diseases as is common today, in which great stress was laid on *elegant prescribing*.

Friedlander speaks of this in "Roman Life and Manners," when he recounts the incident where a rich man, whose slave Galen had cured of a dangerous tumor, asked for the recipe. When he saw that its ingredients were cheap, he demanded something "not fit for beggars". Thereupon Galen taught him a more expensive one. He then experimented on free men and slaves, and acknowledged his indebtedness to Galen for his great success.

These old physicians not only prescribed medicines, but they advised the way people should live, their diet, food, habits, and air and exercise.

Galen, the great Greek physician, taught that people with tuber-

culosis should have plenty of air and nutrition and that milk and eggs were the best.

Is this not our modern idea of the same condition?

Galen was grieved that many tuberculosis patients were deceived by charlatans that recommended cures of various kinds to the people that did no good, but did disturb their digestion, which recommendations were made merely to enhance their own financial gains.

So we find that when people face certain problems that recur in history, they are solved in about the same way, attended with about the same success and failures, no matter whether during the time when Ebers wrote his papyrus, in Roman, in Grecian, in ancient, medieval or modern times.

Today, after fifteen centuries, the prescriptions of Galen are still the model after which most prescriptions are written.

We as dentists would inquire how Galen treated pain, and especially pain in the teeth. The following is his prescription:

R

Pepper (piperis)	3IV.
Saffron (croci)	3VI.
Poppy juice (succu papaveris)	3VI.
Cretan carrot seed (seminisdauci cretici)	3V $\frac{1}{17}$
Anisi	3V $\frac{1}{17}$
Massilian hartwort	3V $\frac{1}{17}$
Parsley seed	3V $\frac{1}{17}$

M.

Sig. Beaten and placed in cavity of tooth.

There were many prescriptions by Galen which like the authors of today, are mentioned simply because some one else had mentioned them; thus Galen says the dried lung of a stag ground to powder, given in honey will help tubercular patients.

The skin of the hippotamus, burned and then soaked in water, applied to the body will cure the same disease.

The skin of the viper dusted on bald spots wonderfully reproduces hair. These and many others are mere repetitions of what others claimed, and while we do not forget their claims, we know men of the present generation who chew snake skins to prevent caries and maintain oral health.

It is very evident that what curative powers there were in these procedures were due to the psychologic element in them, and this same psychological therapeutics is parading today and finds its most popular adherents in the so-called Christian Scientists; so even this is not a discovery, but as old as Galen.

Many of these early prescriptions were what are sometimes called shot-gun prescriptions, for they contained many drugs or cure-alls, and they were recommended for many diseases, and while we do not

believe one drug will cure so many chronic diseases, yet these complacent impressions of ours with regard to progress is true only partially for if we turn to the latest edition of Potter's *Materia Medica* we find iodine has been given many applications. The salicylates are credited with equal powers of many cures. We are not concerned with the fact whether they really do cure all they claim, our contention is that the same principle has characterized all medical writing, that all are polytherapeutists.

In these early times much of the drug trade was carried on by grocers. They gave medicines compounded after a certain formula, which their ancestors had used and which had been handed down through the generations. Often peddlers carried drugs, and they were swindlers for they claimed their drugs would cure anything with which the prospective customer might think he was afflicted.

These were later united into a guild known as "Aromatarii" in Rome, and they collected the crude drugs and compounded them according to prescriptions furnished by physicians, but they often substituted when they did not have the one asked for, and while Galen deprecated such practices, he would not have his own method of drug compounding known. Only through his writings to stimulate original research and not through exposure of their unfair methods, did he aim to do them good.

This is the start of proprietary medicines and the evils connected therewith.

It was in the Middle Ages that we find some very curious prescribing, such as crushed lice. Moss from the skulls of criminals who had been hanged and whose skeletons had been exposed to the elements for years. Mummies, and many others just as unreasonable and unscientific were recommended for therapeutic purposes. And while we condemn them let us not forget the fact that we use cardin for heart disease, and nephretin for nephritis, cerebrin for brain and nervous diseases, and desiccated thyroid extract for cretinism.

Again we note the doctrine of suggestive therapeutics cropping out and it is in line with rational belief that whatever cures were recorded, were due to psychological and not medicinal elements.

Again we note that the problems and difficulties of humanity have been solved in about the same way no matter in what era they occurred. So there is solace in the fact that future generations will follow in our train much the same way, with its approbations and disapprovals similar to those we are pleased to pass upon those whom we have succeeded.

And this same all-controlling trend is more characteristically shown when we come to study superstition in healing.

Inherent in the Greek mind was the belief in signs and portents, and in the popular mind today such beliefs still survive in the superstitions that warn the unwary against the evil consequences of

death and disaster that follow such casual acts as the opening of an umbrella in the house, the breaking of a mirror, and the killing of a spider. One versed in these things will tell you that the opening of the umbrella portends death, the breaking of the mirror, ill luck, and the killing of the spider, rain.

In the West Indies to sleep with the light of the moon upon the face is to run the risk of madness. The negroes of the United States would get one of the hairs of the head of the one whom they wanted to drive mad; this hair would be placed inside the bark of a tree, and when the bark grew over it, the intellect would be gone.

In Selesia, epilepsy and toothache were cured with a ring smithied out of a coffin nail found in a grave.

The belief that there is an evil working power which is centered upon objects which it selects, has existed always, in all lands. This belief was fostered and sanctioned by the early church; by those practicing the healing art, and workers and writers in the Occult Science, then down through the ages it can be traced through legendary transmission even to the present day.

We think of it as superstition and speak of its adherents as superstitious, and it has come to be one of the hereditary transmissions of mankind. We can trace it in the Scriptures, in Proverbs, 23-6; also 28-22; Matt. 6-22; Luke 11-34; Mark 7-22; Psalms 54-7 and 59-10.

In the literature of every people, in every land since history began, no science, no religion, no laws have been able to uproot it, and no power has ever eradicated it from the human mind. It still exists as an acknowledged, mysterious half-belief, half superstition, which secretly exerts a powerful influence over mankind. We boast of our science and our freedom of will, our culture, but still there lurks a something, a feeling, a hereditary instinct that will not be annihilated. Our boasted superiority to vulgar beliefs will not be stilled.

People fear to talk of *good luck* as they say, and immediately tap wood to appease the influence.

In Scotland it is most unlucky to see a hare or a pig cross the road. In Somerset a hare crossing the path in front of the spectator is a sure sign of death. Fishermen everywhere avoid mentioning at sea the name of a hare, pig, salmon, trout or dog, but use other words to convey their idea.

In England it is believed that a child's milk teeth, its nails and hair should be burned, lest injury come to him through neglect of this precaution. The same custom is observed by the negroes of the West Indies.

Cornelius Celsus, a Roman, not a physician but an amateur at medicine, tried to persuade the people of his day to preserve teeth that showed signs of decay, and recommended the following paste:

Poppy	1 part
Pepper	2 parts
Copper sulphate	10 parts
Mix into a paste with galbanum	

This was called *Sory*.

In the event that the cavity was large he added saffron, cardamom and ground mustard. Loosened teeth were tightened with astringents. In cases of throbbing teeth light touches of red-hot iron were applied. In case of accidental loosening, the teeth were to be fastened with gold wire and then astringents used.

For ulcers of the mouth he used honey and astringents. We think today this a good prescription.

Paul of Aegina, in the sixth century, was the first to speak of the removal of so-called tartar.

In the later medieval centuries, Guy de Chauliac wrote a textbook in which chapters were devoted to teeth and their caries and the calculus about them. His formula for tooth powder is about the same as today, and he died in 1365, A. D.

THE PATRON SAINT OF DENTISTRY—ST. APPOLONIA

It was during the festivities commemorative of the First Millenary of the Roman Empire, Feb. 9, 250 A.D., characterized by an uprising against the Christians that St. Appolonia suffered martyrdom in Alexandria, Italy.

During these festivities the heathen populace was incited to acts of piety which was the persecution and slaying of Christians, for this was one of the methods of pagan worship, as it appealed to the benighted mind most strongly.

They would seize the Christians and call on them to utter impious expressions, and when they did not obey they would beat them with clubs, torture them by picking their eyes and face and then lead them to the suburbs of the city and stone them to death. Or they would tie the feet together and drag the victim through the streets over the rough stones, at the same time scourging the victim and finally burning him at the stake, or stoning him to death. Or at times they would scrape them with steel instruments until the body would be torn into shreds, or cover them with quicklime and then pour water on them.

It was at one of these orgies that they seized the virgin Appolonia, and after her refusal to deny Christ and worship the pagan god, they tortured her by beating her jaws and breaking out her teeth, and then kindling a fire they were proceeding to burn her unless she would utter their impious expressions. She appeared to shrink from the flames and as they thought she was about to utter the impious expressions, they gave her a little freedom and released her, but instead of uttering the words she rushed into the flames voluntarily and was consumed.

Appolonia therefore belongs to that class of early Christian martyrs who did not await the death threatened, whereupon she became St. Appolonia of Alexandria and the Roman church celebrates her memory on Feb. 9th and she is popularly invoked against toothache.

She is represented in art as holding a pincers in which is a tooth. Some accounts say that her teeth were taken out one at a time, each time a tooth was extracted she would be asked to repeat the expression, but each time she refused.

She holds a wand of palm which is symbolical.

If you are a visitor in Rome, a little square is pointed out to you as Piazza St. Appolonia.

And while there has come down to us from the ages past a great heritage of proven facts, yet in anatomy, physiology, pharmacy, and therapeutics, instructed skill, patient observation and accurate deduction have been substituted for vague conjecture and bold pretention. Instead of mystical compounds, and nostrums and panaceas, science has introduced her simples and is now working on the vaccines, and thus gives energy and certainty to medication, and we are content to adopt a truer course, to read nature in operations, to compel her to give up her secrets.

350 E. State St.

THE JOHN R. CALLAHAN MEMORIAL

The Fund secured has made it possible to establish The Memorial in the two phases planned, The Local Memorial and The Callahan Memorial Award Commission.

The Local Memorial consisting of a one and two-thirds life sized bronze bust of Doctor Callahan, mounted on granite base, the work of Sculptor Frederick C. Hibbard, of Chicago, which has been completed and placed in The General Hospital Grounds in Cincinnati, will be dedicated at the Meeting of The Ohio State Dental Society in Cincinnati, December 5, 6, 7, 1922, at which time Doctor J. Leon Williams will receive the first Award conferred by The Callahan Memorial Award Commission, composed of seven members of The American Dental Association.

The John R. Callahan Exhibit, consisting of mounted specimens, slides, records, etc., which reposed in The National Research Institute in Cleveland, was transferred to The Callahan Memorial Commission by the Trustees of The Institute to become a part of the Memorial, and has been mounted in a special room in The General Hospital Buildings where it will be open to visitors and be preserved in good form.

The cost of the Local Memorial, together with the expenses of the Committee incurred in its installing, etc., will approximate \$4,000.00,

and will leave a substantial fund which will be turned over to The Callahan Memorial Award Commission to carry on the work for which it was created.

The subscriptions to the fund total \$9,027.51 which have been received as follows:

Alabama State Dental Society			\$ 100.00
Committee—Charles F. Chandler			
Frank F. Perry			
H. Clay Hassell			
California. Dr. J. P. Buckley, Los Angeles			25.00
California Southern Dental Association			150.00
Committee—W. E. Sibley			
Bert Boyd			
Lewis E. Ford			
Colorado State Dental Society (Individual Subscriptions)			205.00
Committee—W. T. Chambers			
H. W. Le Fevre			
H. F. Hoffman			
Delaware. W. C. Speakman			10.00
District of Columbia Dental Society (Individual Subscriptions)			
Committee—A. B. Crane			
W. M. Simkins			
Drs.		Drs.	
Allen C. B.	\$1.00	Macdonald G. B. R.	\$2.00
Baker D. T.	2.00	McCausland	5.00
Basseches Chas.	1.00	Miller L. P.	3.00
Biggs I. E.	1.00	Netherland Frank B.	1.00
Book L. O.	1.00	Palkin J. R.	1.00
Bol Edw. J.	2.00	Price W.	3.00
Binkert A.	1.00	Pairo W. E.	1.00
Cobey H. P.	5.00	Riley H. B.	1.00
Crane A. B.	5.00	Richardson R. G.	1.00
Cuthbertson Chas. W.	1.00	Rush A. E.	1.00
Cole Seth E.	1.00	Spillan H. M.	3.00
Cary Fred	2.00	Shelton Chas. R.	1.00
Cullillier L. M.	3.00	Shade E. C.	5.00
Cole J. B.	1.00	Schalhirt Wm.	5.00
Cummings A. W.	3.00	Stone E. R.	3.00
Conly M. J.	1.00	Solback L. W.	1.00
Dietz B. I.	1.00	Simkins W. M.	2.00
DeFarges J. R.	5.00	Smith Edw. S.	3.00
Evans P. W.	5.00	Taylor J. A.	2.00
Fansles O. N.	2.00	Thorn D. S.	2.00
Horen E. B.	2.00	Taylor B. L.	5.00
Houghtelin W. C.	1.00	Williams C. C.	1.00
Hogan John R.	2.00	Weakley	5.00
Hopkins H. C.	3.00	Wolfe Allen F.	5.00
Lohr V. J.	2.00	Wyman W. W.	1.00
Longcor C. C.	1.00	Cash	1.00
Laytor R. E.	2.00	Geo. Washington	
		Dental School	5.00
		Total	126.00
Florida State Dental Society			126.00
Committee—W. G. Mason			45.00
C. J. Caraballo			
J. E. Chace			
Georgia (Mid-Winter Clinic of the Atlanta Dental Society)			200.00
Committee—Thomas P. Hinman			
De Los L. Hill			
K. R. Armstrong			
Illinois State Dental Society			100.00
Illinois (Individual Subscriptions)			235.00
Committee—Don M. Gallie			
L. B. Torrence			
J. P. Luthringer			
Indiana State Dental Society			100.00

Committee—D. A. House			
F. J. Prow			
C. E. Redmon			
Kansas State Dental Society			200.00
Committee—Monte Gants			
C. K. Weaver			
F. O. Hetrick			
Kentucky State Dental Society			100.00
Committee—H. K. Kellogg			
W. W. Randall			
Henry B. Tileston			
Louisiana State Dental Society (Individual Subscriptions)			
Committee—C. S. Tuller			
C. Edmund Kells			
Leo. C. Dempsey			
Drs.		Drs.	
Broussard A. C.	\$10.00	Howard Mary Jane	10.00
Braud O. L.	5.00	Healey W. J.	2.00
Bennett T. S.	5.00	Kells C. Edmund	10.00
Crozat Geo. B.	10.00	Kelleher Chas. P.	5.00
Capo John T.	5.00	Knapp J. Rollo	2.00
Ducasse A. L.	10.00	La Cour B. J.	2.00
Dempsey Leo C.	5.00	Leoffel O. L.	5.00
Ducasse E. B.	10.00	Moore H. M.	10.00
Ehlert Wm.	2.00	Ory O. J.	10.00
Fort A. K.	10.00	Olivier J. R.	2.50
Foret A. J.	10.00	Sarrazin J. J.	10.00
Guillory A. W.	5.00	Tuller C. S.	10.00
Gorman J. A.	10.00	Tenny J. W.	5.00
Gaston Robt. W.	10.00	Wahl J. P.	5.00
Grosjean S. S.	5.00	Vignes C. V.	5.00
Gross total		205.50	
Expenses for postage, stationery, stenographer, etc.		24.00	
Net total		181.50	181.50
Massachusetts State Dental Society			100.00
Committee—Geo. C. Ainsworth			
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Individual subscriptions	18.00	
Gross total	\$ 390.50	
Expenses, printing, postage, etc.	50.45	
Net total	340.05	340.05
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A. C. Bickelhaupt		
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E. R. Webb, Syracuse, N. Y.	2.00	
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H. H. Turner, Syracuse, N. Y.	2.00	
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Elmira Dental Society	25.00	
	119.50	
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Syracuse Letter Co.	6.99	
Postage	7.00	13.99
	105.51	105.51
Total		1816.56
Ohio State Dental Society		1000.00
Ohio State Dental Society (Preparedness League)		623.80
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Docal O. B.	1.00	West H. C.	1.00
			12.00
Holland, Rotterdam Dental Society			36.36
GRAND TOTAL			\$9027.51

T. I. Way, Chairman Committee,
52 Groton Bldg., Cincinnati, O.

RADIO-THERAPEUTICS

Conducted by A. J. PACINI, M. D.

DEPARTMENT OF BIOPHYSICAL RESEARCH, VICTOR X-RAY CORPORATION

NATURE OF ULTRA VIOLET RADIATION*

IT IS KNOWN THAT SILVER CHLORID, which is white when freshly precipitated, darkens in color if it is exposed to sunlight. Though the change is not entirely understood, it is assumed to be a physicochemical one, and is expressed by saying that sunlight is *actinic*. Actinic means, simply, the quality that radiant energy has of producing chemical change. All radiant energy is actinic to some degree; but light is particularly actinic.

Newton, in 1666, showed that white sunlight was compound, and that if it were made to pass through a prism of glass, it issued as various colors, red, orange, yellow, green, blue, indigo and violet, which have received the name of spectral colors.

When silver chlorid is placed in each of the spectral colors, the actinic darkening which it assumes is observed to be greatest in the blue, indigo and violet regions; least in the red, orange, yellow and green. Ritter confirmed this experiment in 1801; but he found, also, that the darkening took place even more rapidly than in the violet if he held the silver chlorid in the invisible region just beyond the violet. He thus discovered two things: that there is an invisible region beyond the violet, called therefore Ultra Violet; and that this region is actively actinic.

Ultra Violet is, then, a radiation closely kindred to light, is invisible, and strongly chemical in its effect on certain substances. This striking energy must be at once and carefully distinguished from what is commonly known as the "Violet ray". Violet rays are generated in a vacuum tube during the passage of high frequency currents, are converted into heat, are visible, and have little or no chemical effects on matter. Whereas high frequency currents have been used for some time, though not extensively in dentistry, and are useful alone for the conversion into heat which takes place in the tissues, Ultra Violet radiation has only recently received a therapeutic consideration in the dental profession; and because of its dominantly active capacity for inducing chemical change, it is destined to receive very wide application and much concerted attention in this profession.

*First of a series of seventeen articles written expressly for THE DENTAL SUMMARY, to be published successively.

For the production of an amply adequate supply of Ultra Violet energy, the most modern means depends upon a curious phenomenon developed in consequence of the mercury vapor lamps introduced commercially to the world by the late Peter Cooper Hewitt. It is known that when electric energy is impressed through the vapor of mercury, a conversion of the electrical energy takes place which is manifested by an intense and peculiar illumination. Its intensity is immediately appreciated by observing a lamp in operation; its peculiarity rests in the queer hues that faces and fabrics assume under the illuminant. For example, certain red silks appear black; silver coins show as plaques of deep purple; the boiled yolks of eggs seem a dirty brown.

These changes in color are due to a deficiency of certain spectral regions in the illuminant; red, orange and green being almost entirely lacking. But the missing colors are compensated for by the presence of a rich supply of blue, indigo, violet and Ultra Violet. A comparison of the regions of heat, light and Ultra Violet furnished by sunlight and mercury vapor lamps makes this distinction more obvious:

	INFRA-RED	VISIBLE LIGHT	ULTRA VIOLET
Sunlight	80	13	7
Mercury Vapor			
Quartz Lamp	50	21	29

It suffices to say that the most abundant supply of Ultra Violet radiation is derived from the modern form of mercury vapor quartz lamp; and this is the apparatus used in the medical clinic of to-day.

When speaking of light, Ultra Violet and X-rays, it becomes necessary to refer to a standard of wave length, for which the Ångström unit is most commonly employed. An Ångström unit is one-ten-millionths of a millimeter; and the wave length of the various rays, given in Ångström units, are:—

Roentgen rays.....	2 to 12
Unexplored Ultra Violet.....	12 to 500
Extreme Ultra Violet.....	500 to 2,000
Far Ultra Violet.....	2,000 to 3,000
Near Ultra Violet.....	3,000 to 3,600
Violet.....	3,600 to 4,250
Indigo.....	4,250 to 4,550
Blue.....	4,550 to 4,920
Green.....	4,920 to 5,350
Yellow.....	5,350 to 5,860
Orange.....	5,860 to 6,470
Red.....	6,470 to 8,000
Infra-red.....	8,000 to 3,100,000

This table shows, then, that Ultra Violet radiation is physically allied more closely to visible light than to X-rays; and certain general

properties can therefore be anticipated. In the first place, the consideration of the depth to which Ultra Violet radiation penetrates, is of important consequence. Some reasonably exact studies are available that show that Ultra Violet is not a penetrating energy in the sense that X-rays penetrate. For instance, just at the beginning of the Ultra Violet spectrum, at the wave length 4000 Ångström units, the epidermis is penetrated to an extent of about 80-140 microns (a micron is one-twenty-five-hundredths inch). At 3000 Ångström units, the depth to which the energy penetrates is reduced to only 20 microns; and at 2900 Ångström units, only 2 microns of epidermis are penetrated. Three extremely important facts are therefore revealed:

First, that Ultra Violet is not a penetrating energy, like the X-ray; *second*, that as the wave length of the Ultra Violet energy becomes smaller, its ability to penetrate at all is markedly decreased†; *third*, that the wave lengths of Ultra Violet nearest the visible violet, penetrate more than the wave lengths of Ultra Violet farthest from the visible violet.

We have elsewhere designated as Near Ultra Violet the region included between the wave lengths 4000 and 3000 Ångström units; and as Far Ultra Violet, the wave lengths included between 3000 and 2000 Ångström units; so that, speaking generally, Near Ultra Violet shows:

First, relatively long wave lengths (from 4000-3000 Ångström units); *second*, relative epidermal penetration (to a maximum of about 140 microns); *third*, physiological effects accruing from an absorption of the energy in skin layers 140 microns thick, effects collectively designated as "biologic". Far Ultra Violet shows:

First, relatively short wave lengths (from 3000-2000 Ångström units); *second*, practically superficial action (limited to 2 or less microns of penetration); *third*, effects characterized by powerful chemical changes incident to strong superficial absorption and designated as "abiotic," or "bactericidal".

Just as Ultra Violet is absorbed by epidermis, so do other materials act as absorbents, for example, glass. Glass does not permit the passage of Ultra Violet wave lengths shorter than 3022 Ångström units. It is for this reason, mainly, that the tube in which the Ultra Violet is generated is made of quartz* (fused rock crystal); quartz being quite transparent to Ultra Violet, as far as 1849 Ångström units. The absorption of various materials must be known if dental instruments are to be constructed for conveying the energy from the quartz lamp to an oral part. Most "applicators", as these instruments are called, are generally made of fused rock crystal.

†This is the opposite that obtains for X-rays.

*Hence the name quartz lamps.

A reference table, showing the important Ultra Violet bands and some common absorbents, is the following:

TABLE I

Limit of average visibility (violet)	A. U.** 4,000 3,907 3,821 3,752 3,663 3,650 3,544 3,391	BIOLOGIC Near Ultra-Violet
Limit of Canada balsam transmission	3,342 3,126 3,022	
Limit of crown glass transparency	2,967	
Transparency of extra cobalt glass	2,925 2,894 2,804 2,753 2,700 2,654 2,576 2,536 2,482 2,446 2,412 2,378 2,302 2,253 2,225	BACTERICIDAL Far Ultra-Violet
Luckiesh, in his article entitled "Ultra Violet Energy," furnishes some pertinent information on the absorption of various wave lengths of energy in passing through different materials, as follows:		
Natural blue rock salt	Beyond 2250 uu.	
Natural rock salt colored by cathode rays	Beyond 2250	
Natural rock salt colored blue by cathode rays	Beyond 2250	
Sylvits, white	Beyond 2250	
Chili saltpetre, ordinary white variety	3512	
Chili saltpetre, violet	3248	
Fluorspar, colored deep violet by cathode rays	Beyond 2250	
Diamond yellow	3200	
Diamond blue	3150	
Kunzite	3050	
Garnet	4023	
Zircon, (hyacinth) red-brown	2618	
Zircon, decolorized by heat	2442	
Zircon, green	4023	
Zircon, yellow	4023	
Topaz, pale yellow	2618	
Topaz, dark yellow	2294	

**Abbreviation for Angstrom Units.

Topaz, pale pink-brown	2618
Topaz, blue	2961
Emerald	3200
Ruby	3000
Tourmaline, green	Beyond 3512
Tourmaline, green-yellow	3000
Tourmaline, pink	3064
Spinel, blue	4023
Spinel, purple	3248
Spinel, pink	3000
Kyanite, blue	3200
Beryle, blue	3274
Cordierite, blue-purple	3248
Cairngorm	3248

SUMMARY

Ultra Violet must not be confused with Violet ray.

Ultra Violet is markedly actinic, by which is meant that it occasions many chemical changes; it is supplied by passing an electric current through the vapor of mercury.

The tube containing the mercury vapor must be made of fused rock crystal, which is transparent to Ultra Violet.

It is convenient to speak of Near and Far Ultra Violet. Near Ultra Violet includes the region nearest the Violet, from 4000 to 3000 Ångström units. Far Ultra Violet is more removed from the visible violet, including the region between 3000 and 2000 Ångström units.

Like X-rays, Ultra Violet rays are invisible; but unlike X-rays, the shorter the Ultra Violet wave length, the less its ability to penetrate any material.

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PENETOLOGY

Conducted by WILLIAM A. LURIE, Oral Surgeon
1130 MAISON BLANCHE BUILDING
NEW ORLEANS, LA.

This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

PENETOLOGY

The trend of the times in medical science is indicated most markedly in the division of dentistry. Of all branches of medicine, dentistry has made the greatest advance in its half century of organization. It has proven itself a true branch of medicine, and as such has of necessity passed through the several developmental stages similarly to any specialty of medicine; weathered the same criticisms and antagonism as well as having had similar support. In the present day, it is about recognized by all as a legitimate branch of medicine, yet teaching it in its several branches, it is being held apart, as if the connection anatomically and physically between medicine and dentistry, were not yet closely established. However it is being daily demonstrated that the mouth and teeth are but parts of our human machinery, as the fingers and toes and finger-nails and toe-nails are.

The similarity and the relation of the individual parts of the mouth, to other body tissues is being further demonstrated and proven each day. These proofs and demonstrations are not taking place through the medium of some strange or unnatural or particular manner peculiar to the oral cavity, but similar to the manner of discovery of relationships elsewhere about the body.

As this space is devoted to X-ray or penetology as we choose to call it, we will refer to the X-ray of the mouth and to the advances, discoveries and possibilities which lie in this direction. Classification of shadows and the description of the several types of each have been undertaken in previous numbers. It is regrettable that all conditions and their classification cannot be pictured, and pictured as clearly as would be needed to depict all that could be described or written about the individual picture, for each in itself tells more than the print thereof can portray. However, location of the part pictured, the identification of the tooth, its position or the determination of the grade of shadow for classification is a simple matter in comparison with the determination of the character of the process

(speaking of a process about an individual tooth) whether acute or chronic.

It is often said, and it is no doubt true in carelessly taken and improperly-developed pictures, that an acute process is not visible. It is also very likely true in good pictures where the process is of a superficial and gingival character, but where such a process has reached the stage of infiltration of the deeper tissues to the extent of causing a swelling or in any way a localized process, there is the possibility of its being pictured. As changes take place, and as a process changes from the acute stage to the chronic, it can be followed from time to time with the penetrogram, and these changes noted.

The histology of a lesion in the chronic stage and such changes as alter it to permit it to be classified as chronic must be understood. As the pathology in lesions varies with their chronicity and influence on other organs, it is a vital matter to be able to differentiate between acute and chronic processes. It is the explanation of the histological difference which is the key to the reading of the penetrogram and the reading into the picture the stage of the process being examined.

As the penetrogram is the record of penetration of X-rays, and as has been demonstrated, the X-ray penetrates in ratio to tissue resistance, governed by mineral deposit, an acute process, which causes a greater blood supply and exudation of the fluid portion of blood, locally, the mass pictured therefore contains a greater proportion of fluids or soft substance and therefore the picture will contain a greater amount of shadow of Grade 1 or of soft tissue value. There would hardly be visible any of the destruction of bone tissue or any deposit of mineral salts, which changes of course would be read in Grade 2 shadow. A process which has continued to the extent sufficient to be termed chronic, has had occasion to either become circumscribed, encysted or to have destroyed some tissue of heavier character, as bone or alveolus. The chronicity can then be pictured by the marks of limitation of a process, which distinction becomes the more easily and clearly pictured as the process becomes more chronic. A cyst wall, though being the margins of limitation and in a soft tissue of Grade 1 shadow, can be pictured as was explained theoretically and pictured as the penetrographic registration of wax beads in the May number of THE DENTAL SUMMARY.

The reading of an acute process in Grade 1 shadow is a more difficult thing to do, where that process must be pictured upon or through bone, or Grade 2 shadow. However, as just stated by good picturing and careful development that is easy of demonstration, yet practically impossible to reproduce in print without retouching, and in retouching the true ratio is lost.

In bone or alveolar process, an acute lesion, dependent on its location makes itself visible penetographically in various ways. Here again the close attention to the histological changes and the understanding of them in the penetogram where they are recorded as a registration of penetration is of the utmost importance, and the only means of making such a determination.

An acute process, even in bone, before any destruction takes place causes an increase in Grade 1 shadow. Congestion of a periodontal membrane can be pictured because of the increase in the extent of, and the volume of shadow of Grade 1 about a tooth root and the ease with which it can be pictured, outlined and differentiated. Even the condition of the pulps and root canal contents of teeth may be similarly shown. Their outline is sharper, their picturing easier.

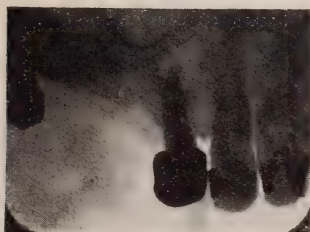
There is no need to describe the well-known chronic apical abscess with its well defined and circumscribed "dark spot." It however is a registration of what bone destruction has taken place. Many of these apical conditions are described as granulomata and at times on extraction a granuloma is recovered. There are others though, in which the limiting outline is not so well defined and in which the typical granulomata are not found. It is in the differentiation of lesions of this character where a close study of the penetogram is necessary and from such study and correlation of what is pictured with the histological change which has taken place that a determination of the toxicity which is taking place from the lesion can be made.

It is obvious that a well walled-off lesion, even though infected may be innocent of any toxicity or of being the cause of some distant trouble, while a much smaller area with much less apparent bone destruction but which is without limitation or limiting shadow may be the cause of any number of distant complications. Such intoxication continues as long as the discharge of toxic material continues unhindered, either locally or into the blood stream, to cause some metastatic focus.

Herein lies the greatest value of the peneto-ray. It is in the picturing of the lesion and its status. It is for the man of medicine and the dentist to determine the ratio of toxicity or infection which is arising from each case pictured. To be able to read the larger lesions without the ability to determine what is taking place in the smaller or less defined areas is a lack of medical knowledge, a knowledge of histology as well as of penetographic interpretation. In the present day such error is inexcusable. It is the error responsible for the irreparable loss of teeth in numbers greater than can be told. In countless cases such losses are suffered without the deriving of any benefit by the maltreated, while a little knowledge might have altered the treatment and perhaps have cured the case

without the loss of teeth. The plea is therefore repeated—"Learn to read the penetrograms."

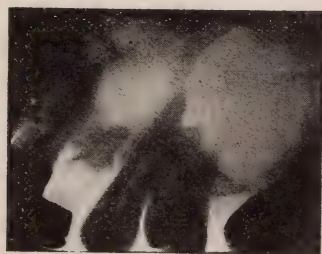
The study of the three conditions pictured below is interesting when correlating the penetrographic findings with the histology and pathology of the conditions as they exist. In picture A, the crowned bicuspid will show two distinct processes. (That is provided it is as clear and distinct as the film or the print at present before me.) There is first and more clearly seen, an area of greater penetrability (in the positive that is indicated by a lighter area) which can be noted in a position above and slightly mesially to that tooth. It incorporates the apex of that tooth. It is roughly triangular with a base about one-eighth inch and a height of about one-fourth inch. Within this area the finer texture of alveolar shadow is missing, yet because of the destruction not being complete, there is a little of the larger and coarser cellular formation visible. While this area is distinct and well defined it is not as distinctly and clearly walled off as the process on the mesial root of the molar in picture B.



A



B



C

Attention is now directed particularly to this light colored spot (picture A) and if the printing does not lose detail, it will be noted that there is a very small, well-defined area directly apical of this tooth in which the registration of penetration resistance is slightly greater than in the area just described. This area is the site of the original granuloma.

The history of this tooth is interesting. There had been an incomplete root-canal filling in the tooth for a number of years. On

picturing, the year before this picture was taken, this root condition, with a small granulomatous area was discovered. Because the patient was seeking to remove toxic foci the attempt was made to refill the root canals after their sterilization. The refilling was apparently nicely done, but an acute process or perhaps the relighting of the old process took place, with the result that an acute destruction of bone tissue took place as has been pictured. There was a discharging sinus, and on removal of the tooth the granuloma came away with the root and the entire destroyed area was explored and demonstrated. It proved larger than pictured.

In picture B, it was evidently hoped that the vitality would continue in the distal root upon the removal of the contents of the mesial. The peridental membrane periapically on this root thickened. There was some destruction of the lamina dura but it finally regenerated about the thickened membrane. This resisted infection. The root canal contents in the distal root did not survive. The resistance against the socket wall was greater and more rapid than would permit regeneration and protection, so all toxic material and drainage from the tooth was taking place through the distal root into the general circulation. This patient, before the removal of this tooth was anemic, emaciated and nervous. His improvement was marked and gradual but certain.

In picture C is represented two well-defined cysts the results of circumscribed infections which were not removed when the teeth or roots were removed. The root stump of the lateral incisor is still visible whereas there is nothing remaining of the second bicuspid except the infection it once had. This case illustrated that it is possible to differentiate the area of destruction and its connection as well as origin. Note the apex of the root of the lateral incisor and the distinctly outlined light area about it and the position of the area about the old socket of the removed bicuspid. Note the lobulation of the cyst as pictured. From the original negative a thin plate of bone or alveolar shadow Grade 2b could be made out about the canine and bicuspid in the center of the picture. However they and the devitalized central (also pictured) were removed in the operation.

This patient was relieved of severe frontal headaches after this operation.

CORRESPONDENCE

AMERICAN CHEMISTRY MENACED—A REPLY

EDITOR DENTAL SUMMARY:

I just completed reading the article "American Chemistry Menaced" in the September issue of THE DENTAL SUMMARY.

Without inquiring into the purposes of Mr. Garvan's mis-statements, I respectfully call your attention to the following facts. The statement is made that "Among those products familiar to the dental and medical professions, are Arsphenamine and Neoarsphenamine, the American names for Salvarsan and Neosalvarsan; Cinchophen, known in Germany as Atophan; Procain, introduced as Novocain; Acriflavin and Neocinchophen. Not one of these medicinal chemicals was made in the United States before the War," and in conclusion it further states "Novocain is an imported article."

As a matter of fact my laboratories were producing Salvarsan and Novocain in our Brooklyn plant during the latter part of 1916; and at least six months before the United States entered the war. I took up the manufacture of these products according to the formulas used abroad and under permission received from the foreign manufacturers, whose patents were still good, as soon as it was apparent that no more of the products could be brought over owing to the "British Order in Council". When the United States took over the patents I obtained licenses from the U. S Federal Trade Commission, as did several other manufacturers. As, however, the trade-mark names Salvarsan and Neosalvarsan belonged to my Company, and were American property, the names could not be used by others, and, therefore, the names Arsphenamine and Neoarsphenamine were adopted as the generic names for other products said to be the same as Salvarsan and Neosalvarsan and made under the patents for these products.

The same applies to Novocain. This was also the registered trade-mark name of the product covered by the patent, and for the same reason we are the only ones making Novocain, which is strictly an American product, and that and Procaine, manufactured by several other concerns, were produced long before the "fertile brains of Mr. Garvan and interested manufacturers conceived the idea of encouraging the building up of the American chemical industry through the medium of the Chemical Foundation," nor was there any encouragement ever asked for or received by us from the Chemical Foundation. It is, therefore, quite evident that the

Chemical Foundation had absolutely nothing to do with advancing the manufacture of Novocain and Salvarsan, and as far as I know, the same holds good for Atophan and some of the other preparations mentioned in your editorial.

My laboratories have been, and are producing Novocain identical in every respect with that produced by the original manufacturers and not a "substitute procain" which may or may not be the same as our American Novocain or the original product made abroad. The product sold by us as Novocain, and under that name and registered American trade-mark owned by us, is produced in an American plant owned by an American corporation with no German interest whatever despite the fact that Mr. Garvan tried to prove it so until the courts ruled otherwise.

I realize that you intend to be fair and give only facts to your readers, and in that spirit I assume that the facts here related will be accorded as prominent a place in a subsequent issue of your publication as were the mis-statements alluded to.

Yours very truly,

H. A. Metz Laboratories, Inc.,
H. A. Metz
President and Owner.

TO THE EDITOR OF THE DENTAL SUMMARY:

In the September issue of THE DENTAL SUMMARY you request hearing from everybody having an opinion regarding Dental Examining Boards.

I have given this matter much thought in the past and just now it has again been brought forcibly to my attention.

After being graduated from a Class A Dental School (University of Pennsylvania, 1905), holding licenses in two states (Pennsylvania and Ohio) and in active practice for seventeen years (twelve years Ohio, five years U. S. Army), and desiring to practice in either California, Texas or Oklahoma, I find it will be necessary to again appear before a State Board, and probably be asked to describe "what passes through the foramen magnum."

Such questions would be easy for the recent graduate, but for us old timers—well, you know the answer.

Now for the suggestions:

I would suggest two kinds of Dental Examining Boards—the first under the auspices of American Dental Association, holding yearly, uniform, simultaneous examinations in the larger cities of the U. S. This examination to be open to all graduates of Class A schools (or could be graduate of any school), and all successful applicants before this Board allowed to practice in any state, (or

in any state upon payment of license fee to the State Board of that state—later described, which should be uniform).

Also, it should be possible for a candidate for dental license to take an individual State Board, whose requirements in most cases would not be as exacting as the National Board, and would in most cases be taken by graduates of schools other than Class A; by those “flunking” the National Board, and again by others not desiring to take the National Board.

For those already licensed before the creating of this National Board, some arrangement would have to be made, as I do not consider it fair to examine a recent graduate and one having over five years experience, by the same standard. It would be as unfair to the recent graduate to measure him by the same rule, as you would an experienced dentist as it would the other way around.

I do not think much mistake would be made, if at the formation of this National Board, all licensed, ethical practitioners be allowed the same benefits as future graduates (or if necessary be allowed to take advantage of them within say five years, upon payment of license fee).

This is roughly the plan I have in mind, the cardinal feature is looking to the future for the uniformity to be expected rather than the trying to get together on past differences of opinion between the different State Dental Examining Boards.

Sincerely,

Columbus, New Mexico.
Oct. 12, 1922.

Wm. J. R. Akeroyd, D.D.S.

SUGGESTIONS

CONDUCTED BY F. R. CHAPMAN, M.S., D.D.S., COLUMBUS, OHIO

(To Our Readers: Give others the benefit of your practical suggestions by sending a description of them to Dr. F. R. Chapman, Schultz Building, Columbus, Ohio.)

To Protect Water Glass

For some time I have had trouble breaking the water glass on my Ritter unit. Probably this tip will be of service to fellow practitioners who have the same trouble.

Place a No. 6 rubber band around the water glass just where it comes in contact with the receiver on unit; this protects the glass from sudden jars.—C. R. Smathers, Johnson City, Tenn.

Treatment of "Trench Mouth"

In the treatment of trench mouth I have found nothing as useful as sodium perborate. Dust it on the diseased tissue, let it act for a minute, then swab. This will aid in the removal of the dead membrane and give your mouthwash a chance to act.

It can also be used to cleanse pulp chambers and root canals. Use it wherever you have been using hydrogen dioxid.

—W. H. Crone, Dental Cosmos.

Cleaning Instruments

Partly corroded and rusted instruments can easily be restored to good condition by immersing them all night in a saturated solution of chlorid of tin, after which they should be rinsed and rubbed with chamois.—Dental Outlook.

To Eradicate a Pus Sore

Oil of Cloves is "par excellence" the most effective substance for use in painlessly cleaning up pus pockets, like suppurating burn blisters, or any lesion except perhaps such as only an operation for enucleation can effect a cure. Flood the pus pocket by whatever means is most convenient and easy. You may make your mind easy concerning injurious effects unless it be swallowed. As it does not cauterize, its effect superficially is but mildly injurious to the tissues surrounding the pus pocket, should a quantity inadvertently escape, whereas in many cases pain and purulence cease immediately.

—J. M. Magee, Dominion Dental Journal.

Limitations of the Fixed Bridge

Let us remember that a fixed bridge is usually the ideal restoration for a single missing tooth. It can be sued to restore two missing teeth, but seldom, if ever, three in the bicuspid and molar region. Often three, and sometimes four incisors can be replaced when the cuspids are included in the abutments. A single abutment should never be used except in the case of a missing lateral, and never then unless the cuspid can be used to receive the attachment. Two upper laterals can seldom support two missing centrals and an upper third molar makes a very weak abutment. These few, simple rules have many exceptions; nevertheless they form a solid foundation on which to base our selection of a method of restoration in cases where the fixed bridge may be indicated.

—*E. Bruce Clark, Dental Cosmos.*

Extracting Roots

When extracting broken-down tooth roots with or without gas they frequently shoot out of the forceps, especially if cone-shaped roots.

A three-quarter inch piece of cotton roll one-half inch thick held between the forcep beaks with a rubber band will prevent the root from leaving the forceps.—*G. E. Cox, Dental Cosmos.*

Pulp Capping Cement

If it be preferred to make one's own cement, add to a small quantity of eugenol about half its bulk of pine resin and approximately 5 per cent. of powdered thymol, dissolving both by shaking vigorously. For the powder use a plain purified zinc oxid such as Hubbuck's. To either of these a trifle of nitrate of silver may be added while mixing if one prefers to use it, or one might use a solution of silver nitrate upon the conserved dentin before covering, or Howe's Silver Nitrate Method may be used. Our next thought is for a covering filling which shall be as tight as possible, antiseptic if possible and as permanent as possible.

—*Otto E. Inglis, Dental Cosmos.*

"Salesmanship"

Of late years we have heard a great deal about office efficiency, salesmanship, and the like, but it must be admitted that most of this has been from the standpoint of making a charge for every minute of time consumed, much less attention than deserved being given to the equally important point of making every minute of that time of the greatest value to the patient.

—*Henry F. Hoffman, International Journal of Orthodontia.*

SOCIETY ANNOUNCEMENTS

OHIO STATE SOCIETY

Preliminary Program of the

FIFTY-SEVENTH ANNUAL SESSION

December 5, 6 and 7, 1922

DEDICATION OF CALLAHAN MEMORIAL
GIBSON HOTEL, CINCINNATI, OHIO

TUESDAY MORNING, DECEMBER 5
Manufacturers' and Dealers' Clinics.

Registration, Mezzanine Floor, 8:30

First General Session, Gibson Hotel, Ball-room, 10:00

Meeting, Board of Directors, 11:00

Ball-room floor, right of elevator.

TUESDAY NOON—12:00 o'clock sharp.

Balanced Diet Luncheon
Sidney J. Rauh, Chairman

Five minute talks on: "Diet and Mouth Hygiene". "The Relation of Dentistry to General Social Problems and Public Health."

The Committee promises a novel program and some surprises.

TUESDAY AFTERNOON—2:00 o'clock.

"Partial Dentures," by Charles A. Furrow, Tulsa, Okla.

"Preventive Dentistry," by Arthur H. Merritt, New York City.

Election of officers.

TUESDAY EVENING—8:00 o'clock.

"Mottled Enamel" (Original Researches), by J. Leon Williams, Solon, Maine.

Discussion by Arthur D. Black, Chicago, Ill.; Weston A. Price, Cleveland, Ohio.

"The Principle of Diffusion Applied to the Callahan Method of Pulp Canal Filling."

"The Positive Destruction of Apical Infection by Electrolytic Medication," by Harry B. Johnston, Atlanta, Ga.

Questionnaire.

WEDNESDAY MORNING—10 to 12 o'clock.

Oral Surgery Clinics, Cincinnati General Hospital.

WEDNESDAY AFTERNOON—1:30 o'clock.

Unveiling of Memorial to John R. Callahan.

Memorial Address, R. Ottolengui, New York City.

Presentation of award to J. Leon Williams, Solon, Maine, by Weston A. Price, Cleveland, Ohio.

WEDNESDAY EVENING—6:00 o'clock sharp.

Informal Dinner in honor of J. Leon Williams, Gibson Hotel, Ballroom.

WEDNESDAY EVENING—8:00 o'clock.

Program of the Session furnished by The American Academy of Periodontology.

"The Bacteriology of Focal Infections," by John C. Meisser, Rochester, Minn.

"Blood Chemistry as a Diagnostic Aid in Focal Infections," by R. N. DeNiord, Buffalo, N. Y.

Discussions by Martin H. Fischer, Cincinnati, Ohio; John Oppie McCall, Buffalo, N. Y.

WEDNESDAY AND THURSDAY MORNINGS—Lecture Clinics.

Beginning at 9:00 o'clock.

"Partial Dentures," Charles Furrow, Tulsa, Okla.

"Gold Inlay Technic"—Indirect Method, Toledo Clinic Club, Toledo, Ohio.

"Root Canal Technic," Detroit Clinic Group, Detroit, Mich.

"Cast Gold Inlays," Roscoe H. Volland, Iowa City, Iowa.

"Elimination of Pus Pockets," Arthur D. Black, Chicago, Ill., and Frederick W. Merrifield, Chicago, Ill.

"Operative Procedure for Removal of Cysts," H. W. MacMillan, Cincinnati, Ohio.

"Orthodontia," Wilson H. Foster, Cincinnati, Ohio.

"Surgical Removal of Mylohyoid Ridge," W. B. Caldwell, Hamilton, Ohio.

"Roentgen Ray as Guide in Pyorrhea," R. R. Roush, Columbus, O.

"Removable Bridge, Wrought Clasps," M. E. Neiswonger, Dayton, Ohio.

"Fixed Bridge," "Porcelain Jacket Crown," by E. W. Graebner, Cleveland, Ohio.

"Full Denture Construction," Cincinnati Clinic Club, Cincinnati, Ohio.

Gibson Hotel, Headquarters. Other Hotels: Sinton, Havlin, Metropole, Grand, Palace, Emery.

W. S. Locke, 503 Andrews Building, Chairman of Hotel Committee, will reserve your room for you. Write now.

REDUCED RAILROAD RATE INSTRUCTIONS

Suggested advice to members of the organization respecting reduction authorized on the certificate plan for benefit of members and dependent members of their families.

A reduction of one and one-half fare on "Certificate Plan" will apply for members attending the meeting of American Dental Association, Ohio Component, to be held at Gibson Hotel, Cincinnati, Ohio, December 5-7, 1922. and also for dependent members of their families. and the arrangement will apply from the following territory:

The following directions are submitted for your guidance:

1. Tickets at the regular one-way tariff fare for the going journey may be obtained on any of the following dates (but not on any other date) Dec. 1-7.

Be sure that, when purchasing your going ticket, you request a CERTIFICATE. *Do not make the mistake of asking for a "receipt".*

2. Present yourself at the railroad station for ticket and certificate at least thirty minutes before departure of train on which you will begin your journey.

3. *Certificates are not kept at all stations.* If you inquire at your home station, you can ascertain whether certificates and through tickets can be obtained to place of meeting. If not obtainable at your home station, the agent will inform you at what station they can be obtained. You can in such cases purchase a local ticket to the station which has certificates in stock, where you can purchase a through ticket and at the same time ask for and obtain a *certificate* to the place of meeting.

4. Immediately on your arrival at the meeting, present your certificate to the endorsing officer, Dr. Henry E. Germann, Chairman, as the reduced fare for the return journey will not apply unless you are properly identified as provided for by the certificate.

5. Arrangements have been made for validation of certificates by a special agent of the carriers on Dec. 5-7, if the required minimum of 250 certificates is presented.

6. *No refund of fare will be made on account of failure to either obtain a proper certificate nor on account of failure to have the certificate validated.*

7. So as to prevent disappointment, it must be understood that the reduction on the return journey is not guaranteed, but is contingent on an attendance of not less than 250 members of the organization at the meeting and dependent members of their families, holding regularly issued certificates obtained from ticket agents at

starting points, showing payment of regular one-way tariff fare of not less than sixty-seven cents on going journey.

8. If the necessary minimum of 250 certificates is presented to the special agent as above explained, and your certificate is duly validated, you will be entitled up to and including Dec. 11, to a return ticket via the same route over which you made the going journey, at one-half of the regular one-way tariff fare from the place of the meeting to the point at which your certificate is issued.

9. Return ticket issued at the reduced fare will not be good on any limited train on which such reduced fare transportation is not honored.

Michigan Dental Examination

The next examination to be held in this state for those seeking license to practice dentistry in Michigan will be held in the city of Ann Arbor, at the dental college building, November 13th to 18th, inclusive.

All further information may be had by addressing:

Dr. E. O. Gillespie, *Secretary*,
745 David Whitney Bldg., Detroit, Mich.

The Tennessee State Dental Association

The fifty-sixth annual meeting of the Tennessee State Dental Association will be held in Nashville, Tennessee, May 2, 3, 4, and 5, 1923, with headquarters at The Hermitage Hotel. A clinical and scientific program of unusual interest is being arranged.

O. A. Oliver, *President*

Joe Minor, *Secretary*

Lambuth Bldg., Nashville, Tenn.

J. W. Winn, *Chairman of Program Committee*

Lambuth Bldg., Nashville, Tenn.

Ohio State Meeting

The Ohio State Dental Society will hold its annual meeting at the New Gibson Hotel in Cincinnati, Dec. 5th, 6th, and 7th, 1922. Dedication of Memorial to Dr. John R. Callahan. Special railroad rates will be available. Make your hotel reservation early. The principal hotels are the New Gibson, headquarters, Sinton, Havlin, Metropole and Grand.

F. R. Chapman, *Secretary*.

The American Academy of Periodontology

The Ninth Annual Meeting of the American Academy of Periodontology will be held at the Hotel Gibson, Cincinnati, Ohio,

December 4th, 5th and 6th, 1922. The Academy will furnish the program for the Wednesday evening general session of the Ohio State Dental Society, which will hold its annual meeting December 5th, 6th and 7th, 1922. The Academy members are invited to attend the meetings of the Ohio State Dental Society.

J. Herbert Hood, *Secretary*
624 Hanna Bldg., Cleveland, O.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held in Louisville, Ky., April 16th, 17th, 18th and 19th, 1923; Seelbach Hotel as headquarters. A clinical program of unusual interest is being arranged.

E. C. Hume, *President*
Wm. M. Randall, *Secretary*
1035 S. Second St., Louisville, Ky.
Geo. H. Means, *Editor of Program and Master of Exhibits*
Cherokee Apts., Louisville, Ky.
Robert L. Sprau, *Chairman of Executive Committee.*

Michigan State Dental Society

The Michigan State Dental Society will hold its annual convention March 27th-31st, 1923 in Detroit.

For information write Bion R. East, 504 Fine Arts Bldg., Detroit, Michigan.

Bion R. East, *Chairman, Local Arrangements Committee,*
Michigan State Dental Society.

Indiana State Board

The next meeting of the Indiana State Board of Dental Examiners will be held in Indianapolis, November 6th to 11th. For further information and applications for examination write to

Dr. H. C. McKittrick, *Secretary*
1006 I. O. O. F. Bldg., Indianapolis.

The Arkansas Special Mid-year Meeting

The Arkansas State Board of Dental Examiners will call a special mid-year meeting Dec. 15th, for the purpose of examining applicants.

Applications must be in the hands of the Secretary not later than Dec. 1st., 1922, for further information and application blanks address,

H. J. Crume *Sec.*
Wilson Bldg.
El Dorado, Ark.

Alpha Omega (Dental) Fraternity Annual Convention

The Fifteenth Annual Convention of the Alpha Omega (Dental) Fraternity will be held in Philadelphia, Pa., on December 27, 28, and 29, 1922.

For detailed information, address the Supreme Scribe,
Dr. B. M. Brickman,
6334 Woodland Ave.,
W. Philadelphia, Pa.

Kansas State Board Meeting

Kansas State Board of Dental Examiners will meet in Kansas, City, beginning at 9 A. M. 1922. For further information, write the Secretary,

G. F. Ambrose, *Secretary*,
El Dorado, Kan.

The New York Society of Orthodontists

The next meeting of the New York Society of Orthodontists will be held on Wednesday afternoon and evening, December 13th, at the Hotel Vanderbilt, New York City.

All ethical members interested in the practice of the specialty of Orthodontia, are invited to attend.

William C. Fisher, *Secretary*.

Institute of Oralogy

Out of town members of the medical and dental professions are extended the privilege of the Institute of Oralogy offices 587 Fifth Avenue, New York City, for consultation and examination of any of their visiting patients.

Yours very truly,
Institute of Oralogy
Dr. Bertram Ball, Director.

Iowa State Board

The Iowa State Board of Dental Examiners will meet for the purpose of examining candidates for a license to practice in Iowa, at Iowa City, College of Dentistry. Beginning Monday, December 11th, 1922, at 9:00 A. M., an examination for Dental Hygienists will be given. For further information and application blanks, address,

Dr. C. B. Miller, *Sec'y*.
726 Fleming Bldg.,
Des Moines, Ia.

Minnesota State Dental Association

The fortieth annual meeting of the Minnesota State Dental Association will be held at the St. Paul Auditorium, February 6-7-8-9, 1923.

C. H. Turnquist, *Secretary*.

American Institute of Dental Teachers

The thirtieth annual meeting of the American Institute of Dental Teachers will be held at Creighton University, Omaha, Nebraska, Hotel Fontenelle headquarters, January 22, 23, 24 and 25, 1923.

A cordial invitation is extended to all persons interested in dental teaching.

A. H. Hipple, *President*

Abram Hoffman, *Secretary*

381 Linwood Ave.,

Buffalo, N. Y.

Dental Protective Association

The annual meeting of the Dental Protective Association of the United States will be held at the Palmer House, State and Monroe Streets, Chicago, on the third Monday of December, the 18th, at 4 P. M. sharp. The report of the officers will be given; a Board of Directors will be elected and such other business transactions as should come before the Association.

All members are urgently requested to be present.

By Order of Board of Directors,

J. G. Reid, *President*

D. M. Gallie, *Vice-Pres. & Treas.*

E. W. Elliot, *Secretary*

Montana State Board

The Montana State Dental Board will hold its semi-annual examinations, the second Monday of January, 1923, at Helena, Montana.

Marshall E. Gates, D.D.S., *Secretary*

Helena, Montana.

The Corydon Palmer Meeting

The eleventh annual meeting of The Corydon Palmer Dental Society held at Hotel Ohio, Youngstown, October 4, 5, was one of the most interesting and enjoyable conventions that it ever has been my good fortune to attend.

The program, extending over both days, was carefully selected, including: "The Diagnosis of Dental Infections and their Relation to Systemic Diseases", by Dr. Weston A. Price, Cleveland; "Diet

in Relation to Oral Diseases", by myself; a brief paper on the same subject by Dr. C. H. Schott, Cincinnati, president O. S. D. S.; "Treatment and Care of the Mouth Along Prophylactic Lines", by Dr. Leslie Waddill, Pittsburgh; a splendid clinic by the Pulpless Tooth Section of the Detroit Clinic Club—Drs. R. L. Girardot, A. C. Thompson, F. W. Dean, G. E. Madison and J. E. Longe.

The work of the new organization within dental organizations, known as "The Defensive-Diet League of America", with which many readers of THE SUMMARY are familiar, was emphasized at this meeting, much time being devoted to it at both sessions, particularly at the banquet at the Ohio Hotel on the evening of Wednesday, October 4. The menu was built under the supervision of the League, according to the requirements of balanced diet laid down by McCollum, McCann and many other authorities, and was made up as follows: Fruit cocktail; fillet mignon with mushrooms; riced carrots; baked onions; asparagus tips; large portion of vegetable salad composed of lettuce, cabbage, onions, green peppers and tomatoes, with French dressing made with lemon juice instead of vinegar. Relishes, celery, young onions, radishes. Dessert, chocolate ice cream. Coffee.

Something like three hundred plates were laid for the banquet, which was open to all members of the society, and their wives, educators and others interested in dietary subjects, and prominent citizens by invitation.

The attendance was unusually large, attention at all sessions very marked, and the cause of dentistry moved forward a peg or two as the results of the strenuous labor of the various officers and committees: J. H. Chessrown, Youngstown, president; G. L. Moore, Girard, first vice-president; E. E. Dyball, Salem, second vice-president; H. D. Warren, Warren, third vice-president; J. T. Williamson, East Liverpool, recording secretary; C. F. Blair, Youngstown, corresponding secretary; J. K. Nash, Youngstown, treasurer. Program committee, T. J. Evans, G. C. Nixon, W. O. Spieth. Clinic committee, C. F. Blair, F. E. Renkenberger, J. F. Steele. Entertainment, D. D. Tomb, F. W. Zimmerman, F. W. Ward.

Ladies were particularly invited, were present in unusual numbers, and special provisions for their entertainment were made.—G. E. H.

OBITUARY

Resolution adopted September 21, 1922, at the annual meeting of the Southern California State Dental Association; a copy to be sent to wife, mother, sister and brother, and to be spread upon the minutes of the Southern California State Dental Association, and copies to the several dental journals.

Gone, yet living in the loving and appreciative memory of the dental profession of Southern California, which he so faithfully and unselfishly served—

Dr. J. George Kanouse, born October 3, 1881, in Appleton, Wisconsin, died as the result of a traffic accident, September 12, 1922, at Los Angeles, California.

He was a graduate of the Dental Department of the University of Southern California of the Class of 1906, but for the past sixteen years was Sales Manager of the California Dental Supply Company, a dynamic force of constructive energy, whose wise counsel and helping hand were always available and generously given. His day of labor knew no sunset, his was a life of loyal and active devotion to service, the Service of Mankind.

The Southern California Dental Association extend to wife, mother, sister and brother its sincere sympathy in their great loss and hour of trial. May the memory of his many kindly attributes, of his loyal and sincere friendships, of his unswerving devotion to duty ever remain in mute testimony of his life of extreme usefulness and labors well done, and be a consolation in their great sorrow.

Dr. Frank W. Chandler

Dr. E. G. Howard

Dr. Fred D. Schildwachter

Committee

RESOLUTIONS ON THE DEATH OF DR. WILSON

The membership of The North Central Ohio Dental Society, having learned of the death of our honorary member, Dr. Geo. H. Wilson, on April 12th, 1922, wishes to express its great loss and sympathy. Be it therefore,

Resolved, That the death of Dr. Wilson, having occurred at the height of his professional achievements, his untimely passing is a great and irreparable loss to the dental profession, to the public, and to this Society in particular.

Furthermore, It is the desire of this Society that a copy of these resolutions be sent to the family of Dr. Wilson, recorded upon the minutes of our organization, and published in THE DENTAL SUMMARY.

C. D. PECK

A. G. THATCHER

J. K. DOUGLAS

Committee

CHRISTMAS SEALS

Our grandmothers playing at postoffice during the Civil War originated the "Charity Stamp" out of which the Christmas Seal has grown. In 1862 a group of women interested in the Sanitary Commission, the forerunner of the American Red Cross, established miniature postoffices in connection with fairs held in Boston and other eastern cities. By 1864, the charity stamp had raised more than a million dollars for the care of soldiers in northern hospitals.

After the Civil War the charity stamp fell into disuse. It was not until 1892, thirty years later, that the idea again appeared in a stamp for Red Cross work in Portugal. In 1904, an enterprising Danish postmaster conceived the idea of using a stamp as a tuberculosis seal and secured royal patronage for launching a Christmas stamp sale to establish a sanatorium for children.

In 1907, Jacob Riis received a letter from a friend in Denmark bearing one of the Danish tuberculosis seals. He described it in an interesting magazine article.

Miss Emily P. Bissell, an enterprising Red Cross worker in Wilmington, Delaware, read the article and adopted the idea, raising \$3,000 for a tuberculosis sanatorium. In 1908, she persuaded the American Red Cross to take up the seal sale and in the first year with practically no organization, \$135,000 was realized.

In 1910, the National Tuberculosis Association took over the anti-tuberculosis work and the organization for the sale of the Christmas Seals and since 1919 has been the exclusive agency in this country for the tuberculosis Christmas Seals, and directing the nation-wide crusade against tuberculosis.

Answer "PRESENT"

when your

American Red Cross

starts the

Annual Roll Call



Armistice Day
(November 11)

to

Thanksgiving Day
(November 30)

*Embrace the Period of Your
Opportunity to be Counted
in Service for Humanity.*

YOU ARE NEEDED

In carrying out the vast peace-time obligations of your Red Cross, which steadily met the stupendous tests of the World War. The work for the Ex-Service men, and their families, and the men of the Army and Navy, and their families; the calls for emergency service in flood, fire, famine and pestilence; in fighting the battle for better health conditions for the people in all sections of the United States, all deserve your support and encouragement. So answer "Present" at the annual Roll Call and gladly pay your dollar membership fee to your Red Cross.

LEGAL DEPARTMENT

CONDUCTED BY ELTON J. BUCKLEY, 643 LAND TITLE BUILDING, PHILADELPHIA, PA.

Liability of Mercantile Associations

I read that the Merchants' Association of Dodge City, Iowa, is about to be sued for defamation of character because its credit department circulated among the members some information to the effect that a certain customer didn't pay his bills. The information leaked out somehow, with the result of damaging the particular customer's reputation. To recover for his injury he threatens to sue.

Since an increasing number of mercantile associations are establishing credit departments, it occurred to me that some information as to the rights and liabilities of such an association to circulate unfavorable information regarding a debtor should be useful.

The legal status of a merchants' association, meaning one composed of manufacturers, jobbers, retailers or anybody giving credit to customers, is practically the same as that of a mercantile agency which sells credit information to its subscribers. The fact that the agency sells the information outright, and the association usually gives it for nothing as a part of its service, makes no difference. Both are protected under the law of "privilege," if they circulate the information in good faith, without malice, and only among people who are interested in the matter.

They are protected even if the information they circulated wasn't true, provided they thought it was and didn't circulate it maliciously.

The law of privilege is a peculiar exception to the law of libel. Let me explain it. If I say to B, speaking of C, "He's no good; he doesn't pay his bills," I am guilty of slander or libel (depending on whether I say it or write it) if my statement wasn't true. And C can get damages from me. But suppose B is a member of a mercantile association. C asks for credit. B doesn't know him and calls up his association for information. The association, acting on apparently accurate information, answers "He's no good; he doesn't pay his bills." In that case the communication is privileged, and the association is not guilty of slander or libel, even though the statement wasn't true.

A communication is privileged where it is made in pursuance of a duty or an interest, such as the interest of an association to protect its members from loss. My statement wasn't privileged because I wasn't under any duty to circulate information regarding C's credit standing and wasn't asked to.

The untrue statement made by the association is not privileged, however, if made maliciously, recklessly or carelessly.

A mercantile association should be very careful to distinguish between unfavorable credit information given to a member asking for it, and the same information published in a general bulletin circulating among all the members. The first is privileged, the second isn't, and this may make all the difference between a heavy verdict for damages and no verdict.

The legal difference is that when the information was given confidentially to the member asking for it, the association was merely doing its duty as a protective association. When it circulated the information generally among its members, possibly not one of whom had asked for it, it went beyond the line of its duty. In the first case the association goes free even if the information given was untrue; in the second case it is liable for damages, possibly very heavy damages.

Of course if the information is true, no action for damages will lie in either event. The truth would be a complete defense.

Everything said above applies to the mercantile association and the mercantile agency alike. The agency, however, plays safer than the association and never gives special information to anybody who hasn't asked for it. Mercantile associations often issue bulletins in which credit information is given for whom it may concern. Sometimes this is in code, but that doesn't make any difference; it is a very dangerous process. If the statements made are true, you are safe; if they aren't true, you may be let in for a very expensive lawsuit. For juries have a way of treating pretty generously a person whose credit has been unfairly assailed as a bad debtor.

The courts always look behind the credit system of a mercantile association for signs of a blacklisting scheme. Read this from one case that was brought:—

The doctrine of qualified privilege has been applied to information furnished to members of subscribers by mutual protective associations. On the other hand it is held that where such association is formed not for the purpose of keeping its subscribers informed as to the credit and standing of the parties with whom they deal, but of blacklisting delinquent debtors in order to compel the payment of debts already due, publication made in the furtherance of such a purpose is not privileged.

(Copyright, September, 1922, by Elton J. Buckley, Esq., 643 Land Title Building Philadelphia, Pa.)

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

DEFENSIVE DIET LEAGUE OF AMERICA

An Open Letter

By G. E. Harter, Toledo, Ohio.

As most of my friends know, especially such as are readers of THE DENTAL SUMMARY, I have been particularly interested in every phase of the great and important subject of diet for many years. Something like ten years ago I read my first paper on the subject before the Northern Indiana Dental Society, at LaFayette, and have been at it more or less ever since. Some of the statements made in that paper are now matters of common knowledge and acceptance among those who have given the subject the study that it deserves. Others have been revised by later research.

At Little Rock, Arkansas, in March, and at Memphis, Tennessee, in May, before the respective state organizations, (and since that time before many district societies), I read papers dealing with dietary matters.

During the discussion that followed the reading of these papers, and in private conversation and correspondence later on, there developed a very great interest in these matters, an interest that I had long hoped for, but scarcely expected.

In person and by letter, many members of the profession have expressed the hope that some action might be taken, having for its purpose the placing of definite, practicable, authentic and dependable dietary information before the profession, in such form as to be most available and useful, both for their own good and that of their patients. As one of them expressed it: "Yes, it is all very fine for us to come here and hear papers like that; we determine that we are going to follow the matter up from that time on; then we go home and forget all about it. Let's get together and keep it going."

It was in response to such demands that the Defensive-Diet League of America was organized. A letter was prepared and sent to dentists in Tennessee and Arkansas, May 20, 1922. The first application for membership was received May 28. Today (October 23), there are members in twenty-three states and in Cuba—not many, by no means a crowd, not one in a hundred as many as there should be, but still enough to insure the work being carried on at least for one full year, with more coming right along.

I think there is good reason to hope for and expect steady growth among dentists who realize that it is high time that the entire problem of nutrition were taken up by the dental profession, not only for the protection of themselves and their families, but also to enable them to become real health advisers to their patients, in order that their reparative work in the mouth may have some chance of permanency. You might as well try to save a burning building by patching the roof as to expect dental operations to restore health to a patient whose body reeks with toxins as the result of improper, unbalanced diet.

Never has there been such great and really intelligent interest manifested in matters having to do with the science of eating; and never before has there been obtainable such reliable information as now. Never before have all authorities been in complete agreement concerning the fundamental principles of correct eating.

It is one of the purposes of this organization to collect, digest, condense and transmit to its members in thoroughly practical form, the results, conclusions, end-products of the work of such men as McCollum, McCann, McCarrison, Phelps, Eddy, Mercur, Mayo, Tilden and many others.

Bulletins are issued monthly, and each will contain vitally necessary information in such form as to be easily understood and practically useful in life and practice.

Instruction with regard to the selection, preparation and combination of foods in proper proportions to yield a balanced diet; foods in health and sickness; special diets for special purposes; dietary prescriptions for patients in connection with local treatment for pyorrhea and other oral diseases; foods that do not agree with each other; foods to be avoided; sources of natural foods, and their supply at cost if desired; and as time goes on and membership increases in numbers and power, we shall be greatly disappointed if the League does not have a very great deal to say concerning the manufacture and sale of foods that do not feed.

Another service rendered by the League and a very great one in the opinion of some of the acknowledged leaders in the dental profession, is the supplying to each member a copy of Albert E. McCann's really wonderful book, "The Science of Eating," a book declared by many authorities to be the most interesting and readable as well as the most helpful ever written on the subject.

That some such service is necessary is abundantly evidenced by the fact that 95% of all diseases, oral or otherwise, have their source in constipation, a condition due entirely to improper diet, and one that no drug can "cure". Constipation is impossible when proper foods in correct combination are eaten.

The Defensive-Diet League is a practical association of practical men, organized solely for practical service. Realizing the important part that such an association is sure to play in the professional life of the dentist, enabling him to render to his patients service of the very highest order, service that is impossible without a fundamental knowledge of corrective and defensive diet and of the results that inevitably follow the violation of dietary laws, membership thus far has been confined to members of the dental profession, the idea being to make each member a genuine health-adviser to his patients.

The entire problem of nutrition properly belongs to the dental profession. There are fundamentally but two factors in this problem; one, and by far the most important, has to do solely with the proper selection, combination and preparation of our *common foods*—not in the use of yeasts, raw breads or any other such fads, but of foodstuffs everywhere available and in every-day use.

Mastication, the other factor in the problem of nutrition, already is in dental hands. The League seeks to make of every member a food specialist, so that he may back up his reparative operations with advice and instruction along dietary lines, of great value to his patients, enabling him to render very greatly increased service and collect correspondingly larger fees.

One of our members reports that he is paid more for instruction than for his operations—which is precisely as it should be.

It seems to me that the advantages of membership in such a League must be apparent to all. To learn all that is known concerning diet as fast as it is discovered by all the able men engaged in such research, and to be able to use that information in practice, would seem to almost anybody to be most certainly well worth while.

From a letter received from Dr. Albert R. Ross, of LaFayette, Indiana, for many years identified with the Indiana State Dental

Association as its secretary and president, the following is quoted:

"This is certainly the biggest proposition that the dental profession can tackle and the most fundamental. I am with you and will do all I can to help the cause."

We have received many other most encouraging letters from members, among whom we now have some of our best-known men.

Membership in the League offers these definite privileges and advantages:

(1)—A copy of McCann's great book, "The Science of Eating".

(2)—Copies of the Monthly Bulletin of the League.

(3)—Copies of THE DENTAL SUMMARY and other magazines containing special articles on dietary subjects, as issued.

(4)—Diet-lists, showing the sources of food-elements and their value in the every-day diet.

(5)—Special diet-lists for dentists and their patients.

(6)—Advice as to diet in health and disease to be supplied on request—for you, for your family from baby to grandad, and for your patients.

(7)—The sources from which natural foods, such as unpolished rice, natural corn-meal, real whole-wheat flour, etc., may be obtained.

(8)—The supplying of books on diet and general physical development at reduced prices.

(9)—And in general the supplying of the latest and most authentic information fresh from the research laboratory of eminent investigators.

Our sources of information are rich and dependable; this method of broadcasting it seems simple, effective and usable. The cost, compared with the service rendered, is very little—only \$10.00 per year.

The organization has the hearty approval and endorsement of many of our best-known men, among them Dr. T. B. Hartzell, late president, and Dr. Otto U. King, permanent secretary American Dental Association. Inquirers are welcome to write them.

By unanimous vote it has been endorsed by three dental organizations, one of which came in as a body without one dissenting vote.

If you are interested, write me.
2370 Glenwood Ave.

My next appointment is at Pittsburgh, before the Odontological Society of Western Pennsylvania, November 16. The next at the Ohio State, Cincinnati; then Evansville, Ind., Dec. 7-8. Then follows a long gap, until May 21, at Wheeling, before the West Virginia State. If any other organizations want my services in the meantime, now is the time to make it known.

Will all the readers of this department kindly spare a few minutes to the Open Letter concerning the Defensive-Diet League of America with which I begin my contribution this month? The work of the League has the hearty commendation of Hartzell, King, Ross, Vinsant, and many other well-known men in dentistry.



"Saving at the Spigot- and Wasting at the Bung" —a very expensive "Economy" practised by some Dentists

WHEN you purchase artificial teeth which require an excessive expenditure of time in grinding and reshaping before they can be articulated, those teeth are expensive and wasteful, no matter how low their initial cost may be. You cannot afford to use teeth that are not readily adapted to their purpose.

Though you eventually succeed in overcoming mechanical difficulties, if the resulting denture does not harmonize with your patient's features, you have criticism and dissatisfaction to meet which seldom creates the spirit of confidence and loyalty that should prevail between you and your patient, even if you do succeed in "talking her into it."

Trubyte

—the teeth that save—all ways

Over a period of years, the purchaser of cheap teeth and cheap materials always loses—his loss is ultimately a money loss but his reputation suffers and the attitude of "good enough" takes a heavy toll in the curtailment of professional growth.

The purchase of Trubyte teeth in quantity lots is a real method of saving that pays money dividends far in excess of any legitimate investment, with the added advantage of absolute safety. It pays dividends in practice building through satisfied patients, and it pays in that inner satisfaction that comes from the use of products of high quality, and if you will take the cash discount instead of the long price you will have the ultimate in saving with the certainty of future results.

"Saving at the spigot", with all it entails, has never been profitable—it is proverbially "penny wise and pound foolish."

RESTORATIONS  THAT RESTORE

Your Dealer or Direct

The DENTISTS' SUPPLY COMPANY

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IPANA TOOTH PASTE

Heals Bleeding Gums

You will agree with the verdict
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—that IPANA cleans and polishes
the teeth thoroughly and without
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ratol content, corrects soft and
spongy gums and heals bleeding
gums.

—that IPANA has a smooth
snappy and delightful flavor—a
treat to children and a pleasure to
grown-ups.

*You and your patients
should know and use
IPANA.*

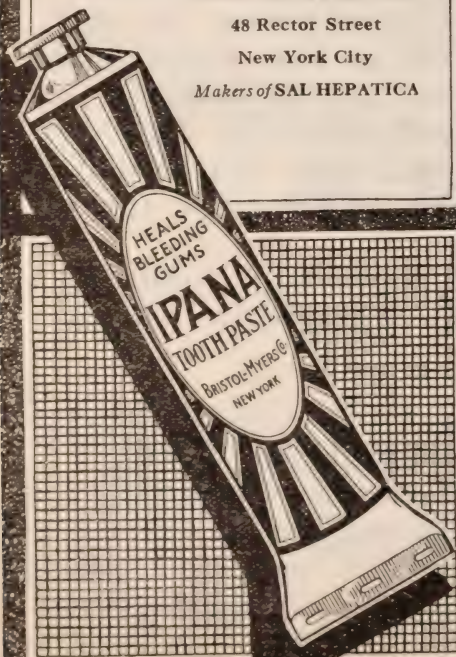
A Professional sample awaits your
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Things are getting rather lively with me these days. An account of the meeting of The Corydon Palmer Society at Youngstown appears in another part of this issue. On the same trip I visited the Lorain County Society, at Lorain, and gave an after-dinner talk on Dental Economics. The meeting was very satisfactory to all concerned. In my opinion, however, it is about time that the State Society took more active steps toward looking after its components, particularly some of the smaller ones. It is just barely possible that some of the little societies would not know that they were components except for the annual call for dues. The State has a provision whereby it will pay the expenses of one lecturer for each component each year. As I understand the matter, the request for such service must come from the component. Why not go one step further and provide such a lecturer whether requested or not? Somebody could be assigned to the work, an itinerary worked out, and each component be requested to make arrangements accordingly, so as to use the services of the lecturer at a time when the time and expense necessary would be lowest. This is merely a suggestion, made without a thought as to the details and may not be worth much; but something should be done to keep alive the interest of the components in their own meetings, as well as to insure their active cooperation with the State.

On October 18, I had the pleasure of meeting with the members of the Eastern Indiana Society, at Richmond, renewing acquaintance with many old friends there, notably Drs. Price and Stevenson. In the afternoon I spoke on Dental Economics and in the evening on Diet with Relation to Mouth Diseases. The result was the unani-

Sal Hepatica

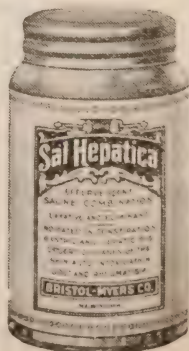
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Local Treatment

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*assists
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The professional man looks to the manufacturer for products that will enable his nimble fingers and knowing mind to attain results.

Pulp-Life is a product prepared to save. It brings exposed pulps back to health and permits filling without removing life.

Full directions accompany each package. If you prefer to go over the directions first, we will gladly send a copy.

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ALSO MANUFACTURERS OF DENTAL
HYPODERMIC EQUIPMENT, LIGHT-
NING DISKS AND STRIPS, NUK-
LORENE AND SPECIALTIES.

mous endorsement of the work of the Defensive-Diet League and the addition of many members.

The next morning at the unholy hour of two o'clock we started for Davenport, Iowa, via Chicago, where a similar engagement was awaiting me. At Rock Island, Ill., I spoke before the Tri-City Study Club; in the afternoon on Dental Economics and in the evening on Diet. The result here was as surprising as it was gratifying. Not only was the Defensive-Diet League unanimously endorsed and heartily commended, but the Study Club came into the League as a body, the annual dues being paid out of Club funds. This is a course that should be adopted by many other dental organizations. It means a clean slate, complete cooperation—and it also means that the Bulletins may be taken up and studied together to the great advantage of all concerned.

The daily press reports the discovery of a series of thefts of teeth from the establishment of the Dentists' Supply Co., New York, variously stated in amount between \$50,000 and \$500,000. It appears that the thefts were effected by employees, the teeth turned over to a confederate, and sold through carpetbaggers, probably, at very low prices. Attention was directed to the probable source from which the peddlers were drawing their supplies by the low prices at which they were sold. It is said that confessions have been made by two of the supposed thieves.

Classified Advertisements under this heading, \$2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more special rate on application.

FOR SALE—Two Chair Office on West 25th street, Cleveland. Doing \$800. a month, cash. Three year lease. Rent reasonable. Price \$1200. Address reply to S. J., care The Ransom & Randolph Co., Rose Bldg., Cleveland, Ohio.

1110-C

Our esteemed friend and coadjutor, Dr. W. A. Lurie, 1130 Maison Blanche Building, New Orleans, has invented and patented a door-lock that should interest dentists, since it is designed to make picking with any kind of device practically impossible. The lock is not yet ready for market; when it is, THE DENTAL SUMMARY will have more to say about it.

The Rotary and Kiwanis clubs of Uniontown, Pa., have united to support a free school clinic. Good work. What about your local luncheon clubs? If your town needs a clinic, go after them.

If bad teeth and other mouth conditions cause arthritis, neuritis, osteitis, angina pectoris, myocarditis and clementinis, what, do you suppose, causes bad teeth and mouth conditions? Think it over.

JUST ONE DAY

Dental office, morning bright;
 Everything adjusted right.
 Dentist ready for the fray
 Of another busy day.
 Steps are heard within the hall;
 Comes a farmer rough and tall.
 "Yank a tooth," the farmer yells.
 "Charge account to Hiram Bells."
 Spits the blood on polished floor;
 Rambles out and slams the door.
 Goes across and tells the crowd.
 (Dentist hears him talking loud)
 "Pulled like sixty, hurt like sin;
 Think he left some of it in."
 Dentist murmurs, "Grateful cuss."
 Savagely cleans up the muss.
 Hears a rap upon the door;
 Says, "Come in," and says it o'er.
 No one comes, he goes to see
 What on earth the trouble be.
 Deaf old lady standing there.
 Asks her in—to have a chair.
 Lady says: "Is dentist in?"
 "Pray what can I do for thee?"
 Says her tooth is sore and loose.
 Wants it "fixed, and no excuse."
 She has "tried to doctor it;
 "Helped it just a little bit."
 Lady opens wide her mouth.
 Dentist looks from north to south.
 Only has just that one tooth;
 But its loose and that's the truth.
 Dentist tells her sadly—"Nay;
 Cannot save it. Only way
 Is extraction—put in new
 Set of teeth so you can chew."
 Dentist fears with every breath
 She'll swallow tooth and choke to death.
 Lady says: "She never could
 "Sacrifice a tooth so good."
 Gets out of chair and goes
 Home, to pet her one tooth woes.
 Next there comes a little man,
 Asking if the dentist can
 Crown a tooth for him today,
 And how much he'll have to pay.
 Central badly broken down—
 (Logan or a Richmond crown?)
 Dentist studies; gives a sigh.
 (Platinum is getting high)
 Desperation! Dentist broke.
 Must have money—watch in soak,
 So, a bargain sure to drive

Says he'll crown the tooth for FIVE.
 Man is shocked, and says: "Oh dear!"
 "Quack and Company over here,
 Make a crown for only THREE,
 With a life long guarantee.
 Save two dollars; I'll go there."
 And he gets out of the chair.
 Dentist looks up at the clock,
 Dinner time! and such a shock.
 In his pocket not a red.
 Wife told him, "Bring some bread."
 Thinks of that old baker's bill.
 "This world surely is up hill."
 Runs his face for five cents more,
 Wanders home, his heart is sore.
 After dinner, it's a shame,
 Luck continues just the same.
 Talks a lot, but what's the use,
 'Bout a lower plate that's loose
 Trims an upper plate a bit.
 Lady says, "It doesn't fit."
 Crown came off and tooth to treat.
 (Quack has money 'cross the street)
 "Shoppers" come and talk and go.
 What's the trouble, like to know.
 Slanting shadows, setting sun,
 Till the dentist's day is done.
 Home to supper; sweet repose;
 What he dreams of, goodness knows.
 Sleeping soundly, needed rest;
 Telephone rings out it's best.
 "Come to office right away!"
 Dentist hears the message say.
 "Tooth to pull; an awful ache."
 Dentist dresses, half awake.
 Hurries down the village street,
 Needs the money, bread and meat.
 Finds the man at office door,
 Jaw is swollen—very sore.
 Man in chair his "cheek" is large,
 When he asks, "What will you charge,"
 Dentist answers, "Dollar bright,
 For extraction in the night."
 Man thinks dollar very big.
 Thinks a while, but doesn't dig.
 Asks, "How much would be to pay
 If you'd pull it in the day?"
 "Fifty cents," dentist replies.
 Man is thinking, (very wise.)
 Says the aching tooth has quit.
 Doesn't hurt a little bit.
 Man gets up, mid dental sorrow,
 Says he'll have tooth pulled tomorrow.
 —D. W. Steele, Brownsburg, Ind.

DEATHS

At Knoxville, Tenn., September 1, Dr.
C. S. Boyd.

At Philadelphia, Pa., September 6, Dr.
William E. Bryce, 57.

At New York City, September 7, Dr.
James H. Minard, 64.

At Albion, Mich., September 15, Dr.
Albert McDonald, 30.

At Newark, N. J., September 17, Dr.
Charles W. F. Holbrook, 68.

At Jersey City, N. J., September 30, Dr.
Daniel G. McNaughton, 81.

At Hattiesburg, Miss., September 22, Dr.
M. S. Wilkins.

At Los Angeles, Cal., September 23, Dr.
Joseph Blackburn Monfort, 65.

At Jersey City, N. J., September 10, Dr.
Alfred Haggerty, 48.

At Chicago, October 16, Dr. Fred Schmidt,
55.

At Charlotte, N. C., September, 18, Dr.
A. M. Bland, 79.



R. & R. Model Plaster

LOW EXPANSION—NO CONTRACTION

So made that it yields the greatest service as a model plaster.

Initial Set—6 to 9 minutes

Final Set—12 to 15 minutes

It is very fine and snow-white, and does not deteriorate with age. Very high in tensile strength. Models show less distortion and consequently yield a better fit. A test will prove its superiority.

Price per can, about 12 pounds, F. O. B. Toledo, \$2.00

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A pure gypsum product, snow-white and extremely fine.

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R. & R. Impression Plaster is made by our special process and is in every way an ideal impression material. It reproduces the finest lines and most delicate contours of mouth tissues, and breaks with a sharp, clear fracture. Contraction: None. Expansion after setting 24 hours: .14%.

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TOLEDO, O. U. S. A.
CLEVELAND AKRON DETROIT FLINT GRAND RAPIDS
COLUMBUS INDIANAPOLIS

*An Announcement to the Dental Profession
of the New Edition of*

E. V. McCollum's

**"THE NEWER KNOWLEDGE OF
NUTRITION"**

New Second Edition—1922—Price \$3.80

Dear Doctor:

Modern dentistry seems decidedly interested in everything relating to nutrition.

Dr. E. V. McCollum, so well known for his development of nutritional research, has addressed the dental profession on many occasions and the enthusiastic reception accorded his work leads us to believe that you will want to own this book which gives the fruit of his many years' activity in his field.

Briefly, McCollum shows by animal experimentation how faulty diet affects the general health—often underlying tooth decay, eye troubles and many nervous disorders; influencing physical and mental development and acting as an important factor in the determination of racial characteristics—but throughout, McCollum's discussion of nutrition has a distinct bearing on modern preventive dentistry.

Believing that every subscriber of The Dental Summary will want to own this book, and particularly members of The Defensive-Diet League, we are taking this space to announce that we have arranged with the publishers to handle this book as a service to our readers.

C O U P O N

The Dental Summary
Drawer 906
Toledo, Ohio

Gentlemen:—Yes, I wish you would send me a copy of Dr. McCollum's NEWER KNOWLEDGE OF NUTRITION for which I enclose check or money order for \$3.80.
(Special Price to Members D. D. L., \$3.00)

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REGULAR CONTRIBUTIONS

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XLII

DECEMBER, 1922

No. 12

ORAL ROENTGENOLOGY IN THE PRACTICE OF GROUP MEDICINE

BY BOYD S. GARDNER, D.D.S., ROCHESTER, MINNESOTA.

SECTION ON DENTAL SURGERY, MAYO CLINIC

AND

DONALD C. LYONS, D.D.S., ROCHESTER, MINNESOTA.

FELLOW IN DENTAL SURGERY, MAYO FOUNDATION

(Written for THE DENTAL SUMMARY)

MANY DIFFICULTIES ARISE in oral roentgenology as practiced in group medicine which are not otherwise usually encountered. These conditions produce undiagnosable films, the causes for which may be classified as movement, elongation, shortening, angle off (lapping), misplacement (crowns or roots cut off), overexposure or underexposure, overdevelopment or underdevelopment, and defective films. (*Fig. 1*). While these factors must occasionally be considered in general dental practice, they are accentuated in the practice of group medicine. Only exploratory, full-mouth roentgenograms can be obtained, because of the various physical conditions of the patients, and in a large group medical practice time is limited. Hence, detail in every particular cannot be expected. Re-rays are necessary for verification of the location of impactions, extent of involvement of pathologic conditions, suspicious areas, and the other misleading factors.

Movement, which necessitates the greater percentage of re-rays, may be due to movement of the film in the mouth, or movement of the patient, either uncontrollable or by gagging or swallowing. It is difficult to prevent the movement of films in the mouth during exposure, generally because of a sudden laryngeal spasm, because the patient does not hold the film firmly, or swallows during the exposure. Such factors can be avoided by previously instructing the patient with regard to what is expected. In some cases a film holder is necessary. Raper¹ says with regard to the advantages of the film holder:

"Slipping (movement) of the films is less likely to occur.

"Gagging is less likely to occur. (This because the films

are not pressed so *hard* against the tissues, and because 'slipping' does not occur.)

"It is less difficult and requires less time to place and hold a film packet with the film holders.

"There is not the danger of placing the film *too far* rootwise or *not far enough* rootwise when holders are used.

"There is less danger of getting the shadows of the teeth on the film at an oblique angle when the holders are used. (The objection to having the teeth on the negative in an oblique manner other than that parts of the teeth may be missed, is that such negatives do not have a good general appearance.)

"In some cases of rheumatism, where the patient cannot raise the hand, and in cases of palsy when the patient cannot hold films with the thumb or fingers at all, but can hold the films readily enough with the teeth by means of film holders."

In cases of oral disease, including malignancy in which the tissue is painful to touch, or cases in which the gums are sore from recently removed teeth, movement usually can be avoided by careful and proper placing of the film.

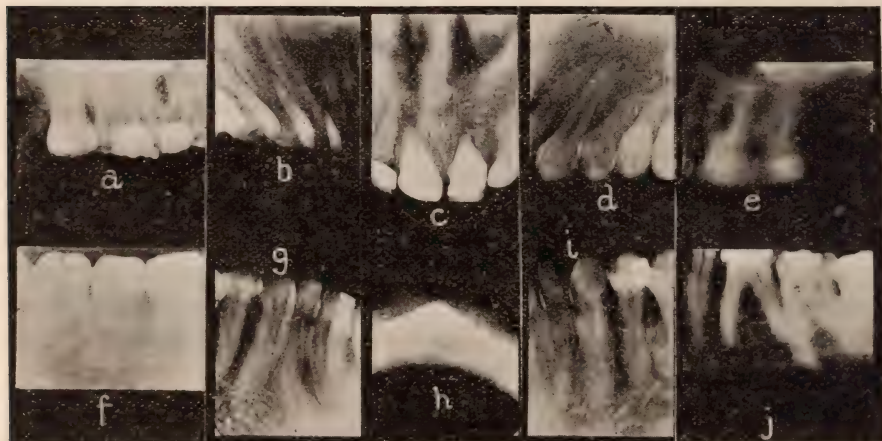


Fig. 1

Fig. 1—(a) Roots cut off. (b) Lapping. (c) Shortening. (d) Angle off. (e) Movement. (f) Underexposure. (g) Incorrect placement. (h) Shortened edentulous mandible. (i) Elongation. (j) Crowns cut off.

A large percentage of patients who present themselves for treatment at the Mayo Clinic come from communities where the roentgen ray is not generally used and they do not know what is expected. A few words of explanation of the roentgen ray, why it is to be used, and a warning to sit absolutely still usually is sufficient to keep such patients from moving during the exposure. Those who are

suffering from chorea, spasmodic torticollis, epileptic seizure, encephalitis with respiratory syndrome, or other nervous disorders that produce constant or spasmodic movement of the body present a different problem. If the patient cannot be kept still long enough to take intra-oral roentgenograms, extra-oral plates are made with intensifying screens to shorten the exposure. While these are not usually so satisfactory in detail as the intra-oral films, they furnish an efficient working diagnosis. If attempts to take extra-oral plates fail, examination must be made without these diagnostic aids.

Many of our patients come to the Clinic from long distances, usually arrive early in the morning, and immediately proceed with their examination. They may have spent several sleepless or restless nights on a train and are tired, nervous, and irritable. Such patients do not give their full cooperation; they gag at the slightest provocation, and satisfactory pictures can seldom be made. They are told to come back the next day after a good night's rest, when a surprising difference in their self-control will be noted.

Other patients present themselves for dental roentgenograms immediately after various stomach tests or, because of impending gastric, functional, or blood tests, they have not been permitted to eat for the previous twelve hours. Such patients are nauseated so easily that it usually is impossible to obtain the routine exploratory roentgenograms without movement, especially in the molar regions. If they return several hours later, when the stomach is again normal, or after a full meal, attempts to take diagnosable roentgenograms are successful.

Patients who have gastric ulcers, malignant lesions, or other diseases of the stomach or esophagus, and those who have hypersensitive palates are perhaps the hardest to prevent from gagging. The best results can be obtained in gastric diseases when the stomach is empty and there is less irritation to the injured tissues. The hypersensitive palate must be dealt with differently. Film holders do not prevent movement, for the slightest touch of the film on the tissue institutes gagging or vomiting. Various mouth washes are sometimes successful, and it is obvious that this effect is wholly psychologic. Drugs which anesthetize the tissue temporarily may be used but are not advised. The quickest and most efficient method in inhibiting nausea in this type of patient is to instruct him to hold his breath. This stops movement of the soft palate and tongue, the muscles of these regions being contracted so that the tissue is slightly raised and arched. The tense and stilled tissue is not so sensitive as when it is relaxed and moved by breathing.

Elongation, shortening and lapping of the films are the next most common cause for imperfection in roentgenograms and are produced by the roentgen ray passing through the film at an incorrect angle. Text-books, magazines, and manufacturers' literature

are full of well worked out charts of angles. Certain angles are to be used for certain teeth. Such charts usually are confusing, however, and more of a hindrance than a help, since most machines are without mechanical devices to obtain these angles. Further, the charts are not practical if a large number of roentgenograms are made every day and every patient presents a different problem. It is impossible to determine that a certain given angle formed by the juncture of the roentgen ray and the film always will produce the correct picture of a given tooth.

Edentulous mouths also present problems, particularly the mandibles of patients in whom the process has been greatly resorbed. Most elderly patients who present themselves for treatment are suffering from long standing chronic disorders which often limit the movement of joints; or, they have nervous disorders with constant movement of one or more parts of the body. Such patients cannot hold the film firmly in place, and film holders are of little value, since there is nothing to support them. Shortening of the image in the mandibular films is almost invariable in the routine full-mouth, exploratory roentgenograms, and there is usually movement in some of the films. It is sometimes necessary to take several roentgenograms before satisfactory results are obtained in such cases.

Underexposure is more common than overexposure due to improper classification of the patient, or conditions of the bone not known or possible to judge without trial roentgenograms.

The classification of the patient is most important in attaining correct exposure. Patients usually can be grouped into those requiring (1) light exposure; in this group are children from six to twelve years; good intra-oral roentgenograms in children under six usually cannot be made; (2) medium exposure; this group includes nearly all young women, and slightly built young men; (3) heavy exposure; in this group are most adults of twenty years or more, and (4) extra heavy exposure; such exposure is necessary for very fat persons and those with exceedingly thick or well-developed facial bones, and for certain elderly persons not edentulous.

There is usually only one second's difference in exposure between each of the four groups if the patients are normal, and a ten milli-ampere Coolidge tube is used with a target-field distance of one foot, and voltage alternating current 110 to transformer. For edentulous mouths or areas, one and one-half seconds to two seconds, according to the length of time the area has been edentulous, are subtracted from the routine time of exposure for the particular patient. The longer the teeth have been extracted and the older the patient, the less the variation from routine exposure. Patients suffering with diseases of bones which either lessen or increase density of the mandible and maxilla, or other facial bones through which the roentgen rays must pass, require a variation from this classification, a point

well illustrated by Case A390564. The patient was suffering from acromegaly of long duration. The first film made with extra heavy exposure was found insufficient, and so re-rays were made at different exposures up to extra heavy plus five seconds which was found sufficient to bring out the proper detail.

The various positions of impacted teeth make it necessary to re-ray in order to check these positions, and to use various exposure times and angles to bring out the best detail. If the oral tissue is so diseased that proper placing of the film causes unbearable pain, or if there is trismus due to an acute condition of the impaction, extra-oral plates must be taken. Rarefaction of bone due to fistulous tracts or other lesions in positions such that the roentgen rays must pass through the structures of the tooth, fall in the same classification so far as checking the position and better detail is concerned.

Films which are not properly placed or slip during exposure, produce annoying results, chiefly cut off root-ends or crowns, making it impossible correctly to diagnose the pathologic lesion or the hidden carious areas. In order to eliminate this error as far as possible, the following plan was adopted at the Mayo Clinic. All films are placed so that an edge 4mm. in width extends above and parallel to the cusps or incisal margins of the teeth. The condition of the patient may necessitate a deviation from this procedure, since different sized films must be used at times.

Because of the pain due to the film impinging on the tissues, it often seems impossible to place the film deep enough in the floor of the mouth to obtain a correct picture of the apical structures. Patients who have been sick a long time, especially those with edentulous mouths, are more sensitive to such discomfort than are healthy persons. Patients with edentulous mouths always are instructed to close the mouth as far as possible, in order to relax the muscles; this does away with most of the discomfort, and the patient's tendency to let the film slip upwards.

Standardization in the method and materials for development, eliminate under-development and over-development. Defective films are very confusing but not common. The chief defect is a raising of the emulsion, which permits a small film of water or developer to enter and so produces a shadow. It is usually impossible to find any raising of the emulsion when the film is dried, but there is a darkened area which exactly resembles a pathologic condition (*Figs. 2 and 3*). Both the films in *Figures 2 and 3* are from a paired film pack, and so were taken, developed, and fixed under the same conditions and at the same time. Even by close inspection with a magnifying glass, it would be almost impossible to differentiate this from diseased tissue. The duplicate film and re-rays for verification furnish the only proof that it is a defective film. Other defects such as creases

in the film, thickened spots of emulsion, or lack of emulsion are more noticeable, and are not so misleading.

It is often necessary to take roentgen rays of patients under treatment in the hospital, in order that the teeth may be ruled out as a cause or a contributing factor in the disease. Due to confining injuries, to casts, rheumatic conditions, spondylitis, or general weakness these patients are not able to move from their beds. Bedside roentgenograms must be made with a portable machine, and each patient presents a different problem to be worked out as well as possible. Measures should be taken to avoid gagging, even at the sacrifice of detail or perfection of the roentgenogram, since nausea is easily produced in such patients and may result in injury or shock. If the patient cannot turn the head at all, areas and teeth which cannot be rayed must be examined or tested in other ways.

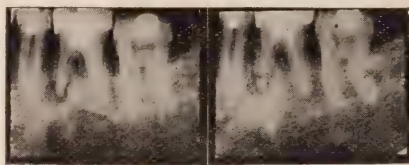


Fig. 2

Fig. 3

Fig. 2—Example of defective film.

Fig. 3—Correct picture of area shown in Figure 2.

It is difficult to take roentgenograms of children under ten years when they are healthy, and much more so when they are sick. Unless they are told just what is to be done and shown how it is to be done, they are frightened and it will be impossible to obtain pictures. When they come tired after a day of various tests and examinations, they are irritable, easily frightened, and often refuse to cooperate. Diagnosis must be made regardless of the quality of the films. No where is the film holder more efficient than in children. It is impossible to take intra-oral roentgenograms of children with mongolism because of their activeness, stubbornness, and irritability.

In case of doubt as to the nature of the disease, abnormal conditions or the position of impactions, anomalies, root tips, and residual areas of rarefaction, re-rays should be made for verification. For example, the routine roentgenograms of one patient (Case A397228) apparently showed two impactions in the upper left bicuspid, two in the upper central, and one in the upper right cuspid. A cuspid and bicuspid had been extracted on both sides. The question arose as to the number of the impacted teeth. The various positions of the impactions on the films led to the opinion that there were five. A re-ray was made; several bite plates were taken. These showed two

impacted cuspids lying in such a position that the misleading roentgenogram could not have been taken otherwise. Disease often shows the same way.

CONCLUSION

The difficulties encountered in making perfect roentgenograms are accentuated in the practice of group medicine, because the physical conditions of the patients play such a large part.

Various tests which the patients undergo, diseases of the alimentary tract, or abnormal oral conditions may easily produce nausea with resulting movement or other imperfections in the roentgenograms.

Elderly patients whose mouths have been edentulous for many years, or who have long-standing chronic disorders are a constant problem, and several roentgenograms often must be made in order to obtain diagnosable films.

Classification of patients according to age, development, and condition of the bone is important in the consideration of correct exposure.

The taking of dental roentgenograms while the patient is in the hospital demands many variations in routine technic in order to obtain satisfactory results.

Careful handling of children, regardless of their physical condition, is an exceedingly important factor in securing cooperation.

If there is the slightest doubt of the correctness of the diagnosis, the position of impactions or anomalies, re-rays should be made for verification.

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DENTAL ECONOMICS—PSYCHOLOGICAL AND PRACTICAL

BY GEORGE E. HARTER, TOLEDO, OHIO

Continued from page 874, October DENTAL SUMMARY

EXPENDITURES:

I told you a little while ago that the dentist needs no instruction in the art of spending money—but he does, and needs it badly. Of course, he knows how to *get rid* of money, but that is not economy, not really spending; it is wasting, throwing money away. The trouble is that such spending is uncalculated, unregulated, haphazard, and depends upon the whim of the moment, rather than deliberate planning.

I once listened to a divorce-case brought by the wife against a husband enjoying a good income which he always had handled in a cool, calculating, deliberate way. The wife complained of non-support; said that her husband was stingy; that she felt that she could not be *free* in the *spending* of money, and that such restrictions constituted the cruelty of which she complained in that her feelings were hurt, etc. Of course, a rousing big alimony was also prayed for. This illustrates the point. The husband provided well enough; but he insisted that the wife calculate her expenditures and live within a certain income which he allowed her. To that she objected, charged him with cruelty, etc., and was left at the post, of course.

Every large fortune has been the result of deliberate calculation and regulated expenditures. I suppose that I must modify that statement. There are plenty of large fortunes made in this country by what seems like mere luck and chance, and in a very short time. But such fortunes seldom last into the second generation. The average windfall of that kind has been shown by statistics to last less than five years. The same is true of money received as legacies, etc.

The dentist needs far more education in the care of his money than he does in earning it. It is not hard for the average dentist to gain a mighty good income. Man for man, town for town, I believe that the young dentist is able to build a better income in a shorter time than members of any other profession. Sometimes I think that it is just on that account that the dentist is proverbially improvident. His money comes early, and so comparatively easily, that he has no opportunity to learn its value by needing it before he gets it. It isn't at all unusual for the graduate to earn \$1,800 to \$3,000 the first year of practice. I was told only a few days ago that the graduates of one of our university dental colleges were being advised by the faculty to set their stakes at \$5,000 for the first year.

*Read before the Tennessee State Dental Association, May, 1922, and ordered printed for distribution. Also, in substance, before the Arkansas State Society, March, 1922, and other dental organizations.

That is too much money for any young man to have unlimited control of at that time of life. By imitation he learns extravagant habits. That is, habits that may not be extravagant for older men, but are such for him. He buys things that he does not need because the other fellow buys them. Begins to talk about "keeping up appearances" long before he knows the kind of appearance that a professional man should keep up. If he hasn't got the money for something he wants, he figures that he can earn more the next month, even boost his fees a little. Most of you know all about this "green persimmon" stage of life. Many of you are wishing right at this minute that you had the earlier years of your practice to live over again.

There seems to be but one way for a professional man to handle his income wisely, and that is to make a budget at the beginning of each year, allowing a definite sum for each purpose, and then stick to it throughout the year, no matter how great the temptation to increase it, nor the ability to do so.

Economists usually consider the division of incomes in percentages, and that is about the only way in which they can be considered. I have gone over several suggested budgets and find none of them satisfactory. To illustrate: All of them allow entirely too much for food, entirely too little for clothing, and entirely too little for savings. I have one that allows 30% for food, 12% for clothing, 10% for savings, which means, on the basis of an income of \$3,000: food, \$75 per month; clothing, \$30 per month, and savings only \$25 per month. Under savings is included all money paid for life-insurance, payments on home, etc. If the income should increase to \$5,000, it would be necessary for that family, in order to maintain the ratio, to increase its consumption of food to \$125 per month, and still save only \$500 per year! And that is nonsense. Here is my way of looking at it:

The man whose income is \$3,000 (or more) per year, net, should begin by chopping that income right squarely in two in the middle, and follow that by putting one of those \$125-per-month parts straight into the savings bank, handing over the other half to his wife, if she is a good manager; if not, himself using it for living purposes. This half may be divided up in any way that seems necessary; but that part which goes into the bank should be drawn upon only to meet "rainy-day" needs: insurance, taxes, doctor and dental bills, payments on a home or repairs on home if already owned, things that have nothing to do with the ordinary, every-day items of living—food, clothing, rent, amusements, education, etc. A family of two or three can do with that amount very well indeed, and even a larger family, so long as the children are small. As the family increases and the children grow up, the allowance for home costs must be increased in proportion; but by that time the income should have increased also.

From \$300 per month, savings should increase rapidly, while, of course, the allowance for living need increase but slowly. If two or three people can live on a food allowance of \$25 per month when the income is but a thousand dollars a year, is there any good reason why the same two or

three people should eat up \$125 per month, just because the income has increased to \$5,000 per year, or \$250 per month when it reaches \$10,000? You see where this percentage business carries calculators who indulge more in theory than in thought.

In other words, the man who is enjoying an income of \$3,000 per year or more, over and above the 40% of his total earnings that should be regarded as his costs, should save at least half of that net income. I want you to learn to really *save*, save until it hurts, save until you feel deprived of something that you would like to have. Have you any idea what this will do for you? It will dam up your energy; it will condense and concentrate it, just as does a dam across a stream, as does the resistance-element in an electric motor, as does the arc in the wire connecting up electric lighting systems. Dam it up, concentrate it, condense it, make it irresistible, until the first thing you know you are drawing to you an increased income, making possible the accomplishment of your wishes and much more.

Desires must not be gratified too easily. There must be something that you want all the time, something that you very much want and feel that you cannot have just then. If you are to be successful in living, not merely in accumulating money, you must do something to keep up your interest in life. Nothing so completely destroys that interest as gratification, the having of everything you want as soon as you want it.

It is said of Bernard Shaw that he could have anything in the world that he might want—but that, because he does not want anything strongly enough, he has missed the great opportunity to become a leader among men. There is a law in the universe that requires that we shall pay for everything we get, and pay before we get it. And this paying means concentrated application of thought to the end of the accomplishment of our purposes. If there is no want, there can be no concentration. Unless there is an obstacle to be removed that requires concentrated effort, things come far too easily for the development of that sort of character that demands what it wants and gets it by reason of that demand. “Come easy, go easy,” is an ancient aphorism, just as true now as ever it was. One seldom sees silver handles on the caskets of those who were born with silver spoons in their mouths.

Remember this:—You often may have the money to buy something that you cannot afford to own.

Again, I am not trying to solve your problems for you. That would do you no good. I am trying only to make you think about your income, to show you how to get onto familiar terms with the dimes and the nickels as well as with the dollars and the hundreds. You must live in a very familiar relation with your income if you are to do anything with it toward a competence when you grow old. I wonder how many of you know that only three per cent, only *three* in every hundred, of the men over the age of 65, are self-supporting? All the rest, 97%, are being supported by their children or relatives or at public expense. You must learn to know

every in-curve and every out-shoot of your income; learn to play with it, and to keep it under complete control.

Comparatively few dentists ever grow rich upon what they are able to save out of their earnings only. Of course it is possible in many cases. But usually your savings will do no more than give you a nucleus, a nest-egg; nothing very big, but, nevertheless, very important, as you need never expect to get anywhere without the saving of a good, big slice of every dollar you earn. This forms your capital, gives you something to stand between you and want should anything happen, and something to invest when the time comes and the right thing comes your way.

Cheer up; we are on the home stretch. The next lap brings us to the end of this long-drawn-out dissertation, which is, at that, only half as long as it should be even to begin to touch the subject on its vital spots.

INVESTMENTS:

Let us suppose that we are beginning to make some headway in a financial sense. Your savings account is growing large enough to be seen with the naked eye, and other eyes are seeing it as well as your own. You are becoming a capitalist. Your savings are earning interest. The bank is paying you for the use of your money, just as it will expect you to pay interest on the money belonging to other depositors that you are going to borrow as soon as you learn how to make other people's money make money for you; in other words, just as soon as you get financial legs under you and begin to stand upon them.

Understand you are not to *spend* that money for *anything*. *Spending* money is buying with it something that is consumable, that is used up and destroyed. "To spend" means to exhaust, to dissipate. Exchanging one form of property for another is not spending. Money, you know, is not at all what many people think it is. It has no value of and in itself. The intrinsic value of money is a mere fetich used for political purposes, and to keep the masses of the people in ignorance. Money is simply a token of undissipated increment. An evidence of thrift; that you have not consumed, used up, all that you have earned. The value in your money is what you have put into it and not drawn out—your time, skill, energy, knowledge, that may be exchanged for other forms of value at will. The money you put into the bank is doing two things: It is earning interest and it is helping to build for you a financial character that will serve you well later on, when you get ready to make investments, and that is to be our subject for the next few minutes.

While you are building up your savings account and becoming a capitalist, you should cultivate a dislike for debt. If you owe bills at the stores or elsewhere, always pay them promptly and according to the terms of those who have extended credit to you. Remember that you are the one accommodated. I do not believe in paying any bill over one dollar in cash. Pay by check, but always pay. After you have cultivated a life-saving dislike for debt, you are a safe borrower, and you will find banks always

ready to accommodate you. The way to make money is by borrowing money; of course, providing you have found a way by which you can make that borrowed money earn for you enough to pay your interest and leave a profit for you. One nice thing about using borrowed money is that it hasn't cost you anything. I mean, hasn't taken any of the years of your life to earn it. It is yours to use because you have established a financial character while you have been saving that first little nest-egg. The right and the ability to borrow and use money that you have not earned is a part of the "unearned increment" that you have accumulated while building up your financial character. And that character must be maintained by taking care of your loans promptly, on the dot. Never neglect your financial obligations. If you do, you may expect your financial character that you have been years in building up, to leave you over night. Banks exist for the purpose of lending money; but they want to lend it to men who respect their financial obligations and live up to them.

You must learn to respect your savings as you respect a good friend. As you would not "talk about" a good friend, the very first thing for you to learn is to keep your lips closed about your savings. Don't talk about your money. You know that you have it, and the bank knows about it; and that's quite as far as the talk should go. Keep your money affairs secret. Do not let your left hand know what your right hand does in such matters. Following this advice will save you a lot of worry and may also save your money. If you advertise that you have any money you may expect relatives and friends to besiege you for loans, with so-called investments, some of which may look plausible and even inviting. Talking about your money is equivalent to the actions of Uncle Reuben who comes to town once a year to sell his wool, and walks about the street with his pocket-book in his hand, telling everybody who will listen how much he has. Somebody is going to relieve him of it if he can. Don't put yourself in any such position.

If you are tempted to try to "make a show" with your money, just remember that there are a great many people in the world who have a great deal more money than you have or need expect ever to have, and that the only thing that counts in a plutocracy—that is, in an aristocracy based upon money—is money, more money, most money. However distinguished you may become professionally, no matter how high you may stand socially, you should not waste your energy hoping to reach the front rank as a plutocrat, even if that far from enviable distinction loses its proper valuation in your esteem, and becomes the goal of your misled ambition. There are many things in the world worth a great deal more than money.

If you have enough money the trouble will be to prevent its talking for itself. If you have only a snug little nest-egg which you hope to see hatch into a brood of dollars sufficient for a competence, commit this rule to memory and live by it:

Rule 1. *Don't let anybody know that you have money.*

When you think you have enough money to invest, that is to change one form of property into another profitably, begin to study the subject, make yourself intelligent about it, learn all that there is to know about the different kinds of investments. You will find the subject very interesting. There are many sides to it, and you want to know as many sides to it as you can learn. If you will write to The National City Co., New York, or any other first-class investment house, and ask for their pamphlets on investment, you will receive a bunch of literature that will keep you busy at night for six months, and enable you to learn so much about business and finance that you will be convinced that you knew nothing when you began. So long as you are merely reading something you have not begun to learn. When you have become able to form judgments as you read, when you find yourself forming opinions as you go along, you will have begun to get somewhere. Good practice may be had by watching the course of investments that you might have made but didn't.

About the time your savings-bank balance reaches the first thousand dollars, you are likely to find yourself infected with a strange malady, a malady that has caused the permanent disability of many a promising financial career, not infrequently its death. This malady is very well known to shady brokers and confidence men. It has been studied, classified, and named. It is called "Investment Itch."

That first thousand seems a mint to its owner. And it is a lot of money. It is more than hundreds of dentists ever had at one time. It is the biggest thousand dollars that you ever will own. It is big, because you have earned it and saved it. The more self-denial it has cost you the bigger it is and the more it is worth. And the disease to which it gives rise has been fatal to more budding financial aspirations than any other one thing in all the world. The easiest and the quickest way to cure this disease is to "invest" the thousand in the first thing that comes along! And this brings us to our second fundamental rule:

Rule 2. *Do not put your money into investments that hunt for you.*

Especially avoid those that come a long way to find you, and those that claim to be especially designed for professional men and others of small or ordinary means.

Remember this: No really good opportunity for investment *ever* goes begging for money. There was a time when this might not have been entirely true in every case, but it is true now. Money is standing waiting for every really good opportunity. There is always enough idle money in Colorado to finance every good mining prospect in the state; there is enough money seeking investment in the city of New York to finance every reasonably safe proposition that is offered there. If a scheme offers a fair prospect of success, home money will, as a rule, take care of it. You and I need not hope for a chance at the really good things a thousand miles away. Good investments need not travel over half a continent to find somebody who is ready to take them up. On the other hand, if a propo-

sition isn't good enough for those on the ground, in position to know all about it, it surely isn't good enough for a professional man who knows just about as much about speculation as a Brazilian monkey knows about the ten commandments. Let the other fellow, the "wise guy," have all of it. Better for you to be safe than sorry. A dollar in the bank earning and paying four per cent is worth a lot more than a thousand dollars in a Yucatan coffee plantation that promises fifty per cent and never gives anything except promises.

Since arriving in Memphis a gentleman inquired concerning a friend of his in Toledo with whom he had invested quite a sum in a mining venture sixteen years ago, the only "returns" from which, in all that time, had been notices of assessments to meet expenses necessary to keep up operations.

The following extract from an article by Charles Albert Callman, published in Henry Ford's *Dearborn Independent*, June 17, applies so aptly that I cannot resist the temptation to add it right here:

THE FIRST THOUSAND DOLLARS

"The young man who has saved his first thousand dollars, won through individual effort, holds the future in his hands. Yet there are persons mean enough to make it their life's business to prey upon Young America and demoralize his ideas of thrift. For years I have received communications and queries from young men regarding the status of 'investments' they had been induced to make with their first \$700 or \$800. It is a fact not alone distressing but alarming that 99 7/8 per cent of such investments are made in valueless securities.

"It is doubtful whether these young men could be induced to part with their money so readily, if they knew into whose greasy hands it would lodge, and if they would learn the lesson that even though some such property may have intrinsic value, its stock is probably worth less than blotting paper.

"Year after year new mining stocks are listed. In a short time they vanish, to be replaced by others. A glimpse at a few of those in which country-wide investors have dropped their money may be enlightening.

"Ely Copper Company. Idle since 1907. Unfavorably regarded.

"Ely Consolidated Copper Company. S. M. Levy, president, at last accounts. But still quoted at three cents a share. No work done in recent years. Some of its copper below commercial grade.

"Butte-Balaklava Copper Company. I. Freimuth, president. Stock sold in 1910 at \$14.50 a share. Interest on bonds unpaid since 1917. Property idle. Foreclosure proceedings by bondholders expected.

"Tonopah-North Star Tunnel & Development Company. H. Zadig, president. Since 1916 the company has made sundry shipments, but not sufficient to meet expenses.

"La Rose Mines Company. Shares \$5, reduced in 1917 to \$1. La Rose is a liquidating property. Shares selling at 25 cents.

"Jumbo Extension Mining Company. Idle save for work at its subsidiary, Jumbo Mountain Mining Company. Reported that the company was recently about to abandon the latter mine, as the owners demanded \$50,000 due on the purchase price.

"Yukon Gold Mining Company. President, William Loeb, Jr., one-time secretary to President Roosevelt. Dividend payments suspended 1918. Report for 1919 showed deficit of \$1,108,684. Marketed by a Boston operator at \$7.50 a share. Selling at about 75 cents a share.

"The young man who has saved his first \$1,000 may find it trying to shut his eyes to the tempting bait of speculation. But it should be easy to prove to him the folly of placing his initial capital at random in mining or oil shares.

"The tables as given below illustrate the losses suffered by the small investor who gambled. They also show what his capital would have amounted to today had he placed his money in a savings bank, or in a sound investment:

	What his account would show today
Gambling vs. Thrift	
If he had placed \$750 in the savings bank at 4 per cent in 1916.....	\$ 930.00
If he had bought 200 shares Emma Copper for \$750 in 1916.....	0
Advantage of the investor over the speculator.....	\$ 930.00
If he had deposited \$1,000 in the savings bank at 4 per cent in 1915.....	\$1,280.00
If he had bought \$1,000 worth First National Copper in 1915.....	60.00
Thrifty man's profits, compared with the speculator's.....	\$1,220.00
If he had bought Liberty bonds at 4 per cent in 1919.....	\$ 829.40
If he had bought 10 shares Simms Petroleum at \$71.50 in 1919.....	100.00
Difference between investment and Curb speculation.....	\$ 729.40
If he had bought a bond in 1917 at 4 per cent.....	\$1,200.00
If he had bought 100 shares Island Oil at \$10 in 1917.....	65.00
The investor's gain over the gambler's.....	\$1,135.00
If he had bought \$900 in 4 per cent bonds in 1919.....	\$1,044.00
If he had bought 600 shares Allied Oil at \$1.50 in 1919.....	12.00
The gambler's potential loss	\$1,032.00
If he had put \$1,650 in the savings bank in 1917.....	\$1,980.00
If he had bought 100 shares Boone Oil at \$16.50 in 1917.....	12.00
Where oil speculation does not pay.....	\$1,968.00

"These examples should leave little room for further comment over the difference between gaining an assured competence or hazarding one's savings in speculation."

Keep your money fluid, ready for quick action when some really good thing comes your way—something that you and your friends know all about—and that your banker or your dental dealer can really recommend.

Even investments right at home that go gunning for investors of small means are best avoided. The more plausible the thing looks, and the harder it hunts you, the more it should find you deaf, and especially the more it should find you and your money dumb. Don't let your money "talk back" to such things.

Sometime ago, up in Toledo, somebody conceived the scheme of organizing a company to build and operate a number of small moving picture theatres, and of selling the stock to our citizens. In many such cases the promoters do not risk a cent of their own money, while still holding the control and raking off the first profits in the form of salaries, commissions, etc. In this case agents were sent to everybody who owned a share of bank-stock or had any other investments to any extent. One of them haunted me for a few weeks, under the mistaken notion that I had money. I turned it down. Finally, he came rushing out to my house late at night. He was certain that he could interest me at last. He told me that the "Company" had decided to donate two shares of the common stock to every purchaser of a single share of the preferred stock! He said that to me with such a look of complete confidence that I had to harden my heart as I told him that I did not buy anything that had to offer a chromo as an inducement. Do you suppose that really good and safe investments need to be sold in that manner? How much premium do you suppose that Standard Oil or U. S. Steel ever offers as an inducement to purchasers? Of course, it is

precisely the other way around. If you want that kind of investment you must expect to pay a considerable premium for it—sometimes two or three dollars for every dollar.

The investment in which your money will most likely be safe is not the sort that hunts for buyers, offers special premiums as inducements, or anything of that sort. The kind of investment that you want is the kind that wise people hunt for.

Beware of the highly colored prospectus; of the one that bases its half-promises upon what has been done by some older concern in the same general line, or upon possibilities that the promoters know that you will not stop to analyze, even if you are able. Beware of the glib-tongued salesman who has learned his lesson by rote at the hands of some very smooth Wallingford, who has studied every word with special reference to its convincing emphasis. Beware of offerings backed by the opinions of well-known authorities in the industries represented unless you *know* that those men are investing their money on the same basis as that offered you.

We had an example of this sort of thing up in Toledo a year or two ago in what is known as the Modern Glass Co. I understand that you had an opportunity to study this particular kind of "investment" right here in Tennessee not so long ago. This concern was recommended by some of the best-known men in the glass industry; that is, its prospectus was so written as to make it appear that they were back of it, although the sequel, brought out in a bankruptcy court, showed that they had loaned their names simply as a promotion factor, and that none of their money ever had been invested in it.

Fifteen million dollars were taken away from innocents in Toledo alone during 1920, and it is said that during the same year, four hundred millions were taken away from the supposed wise men of New York city. By the way, more suckers are born in New York every year than in all the rest of the United States. It is said that an army of forty thousand crooked investment salesmen swarm about the streets and office-buildings of New York.

Never forget that many great fortunes have been accumulated dishonestly, although not illegally; that money-getters have no ethics; that they would as soon take money from widows and orphans, or from blind beggars for that matter, as from anybody else.

I had opportunity to study such a case at first hands. A company was organized in Toledo a good many years ago. Its organizers knew that it could not succeed as a legitimate enterprise. Seemingly it was organized for the sole purpose of selling stock. And the stock was sold. The chief conspirator was the superintendent of a large Sunday school. He peddled the stock among the teachers and pupils in his Sunday school, in one or two instances taking the last dollar from aged and decrepit women, tempted by promises of large returns. When the end came, the only thing that saved

the chief from the penitentiary was the fact that some very highly respected citizens were implicated with him, either knowingly or otherwise.

Beware of *offers* of all kinds. Avoid them simply because they are offers. They may be all right at that; but you must be safe. You have no right to speculate with that first thousand dollars. Any investment that makes an open bid for the purpose of attracting dentists, preachers, doctors, lawyers, teachers, widows, or others who are supposed to have only a little ready money, is proverbially bad. No matter how well it seems to be backed up; it is better for you to let it alone. "It is poor fish that may be caught in any stream." The better the investment the harder it is to get.

Rule 3. *Invest your money, particularly your first money, in things known to be so thoroughly sound and safe that they do not need to advertise, and most certainly do not seek out the man with small means.*

Rule 4. *Do not invest in anything that seems mysterious; that you do not thoroughly understand.*

Whenever you feel strongly tempted to violate any of these four rules, get together all papers and other available information and ask for an interview with the head of your dental supply house, or with a banker, preferably the banker with whom your deposit is kept. Take all of the information you have with you. Ask for a frank expression of opinion as to the value and suitability of the investment for *you*. Tell him how much or how little you have to invest and how much it means to you. If you are consulting a banker, ask him this: *Would you recommend this investment as a good one for a guardian, or a trustee, or for your own bank?* That will knock the coon out of the persimmon tree unless he is a crook, and interested in the investment in question. If he tells you that you must follow your own judgment, have nothing to do with the investment.

(To be continued)

IS IT EXONERATION? BEARING OF RECENT DIAGNOSIS UPON DENTISTRY

BY L. C. O'DONNELL, D.D.S., GREENVILLE, OHIO

(Written for THE DENTAL SUMMARY)

IT IS THE DESIRE OF THE WRITER to call attention of the Dental Fraternity, to a new diagnosis of disease, and to request their investigation of certain conditions now being brought to light which affects us both personally and professionally.

Years ago members of our profession were of the opinion that pyorrhea was of syphilitic origin, and since then we have discovered the pyorrhea expert; but today we are still at sea and now Dr. Hartzell shows how, by thorough cleaning of the teeth, we can control the disease. Then we have the diet entering as a factor in the control and causation of this disease.

We are informed that malocclusion, defective fillings and bridges, etc., are causes, and these take us back to the uncleanly condition and we are again no further than before, for we have a recurrence of our trouble whenever the patient becomes careless and the mouth is neglected.

When we endeavor to create a condition of the mouth and teeth rendering them fool-proof or self-cleansing we manage to hold the pyorrhea in suppression but beyond this point we have not been able to make any progress toward the eradication of the disease.

In this connection it is desired to quote a rather peculiar remark that was made by a patient which was "I have eyes and ears and they do not need care; why should I need to care for the teeth?" To some extent this is logical and again it is not. We have become civilized or uncivilized in our habits of life and we must counteract these conditions by other means; but should the teeth need this attention to the extent that apparently is necessary to-day?

Is there not some underlying cause for our troubles that we have not as yet learned? Why do we develop pyorrhea, why is it so stubborn and why is it gaining ground and we as dentists failing to keep apace with it by finding some cure? Are we not only checking the cases as they appear and making but little headway? Something is wrong somewhere, but what is it?

Now we are informed by Dr. Abrams that the race has been impregnated with Bovine Syphilis through the medium of vaccination and that almost all of us are carrying a high ohmage of this in our systems. It is also stated that pyorrhea responds or clears up when the syphilis is eradicated from the system for the body has been cleansed of the soil necessary to develop pyorrhea.

Will this account for the former idea of syphilis being the cause of pyorrhea, and the increase of the disease being due to the increase of vaccination or the impregnation of the people with the Bovine Lues?

Another feature of the Abrams diagnosis is that streptococci infection is more general than we have supposed and this will account for the failure of various cases to respond to extraction. This would appear to lessen the cases of local infection, for we have a general infection and the teeth in some instances may be the foci of increased infection, and their extraction would lessen the amount of general infection, thereby improving conditions temporarily. A case of focal infection would be rare and so we can account for some of our problems.

This would not exonerate us from all blame, as poor canal fillings, etc., will increase the general infection and lower the resistance of the patient so that other conditions might arise. If, however, the general infection by streptococci should be cleared up, would faulty canal work be much of a factor in disease? This may account for some past conditions also, for the older men in the profession have not always experienced the conditions that exist to-day.

Has not vaccination also infected us with streptococci infection? What causes the swollen arm when vaccination takes? We know more about the "taking" than the laity and the "taking" is the streptococci infection.

Another case of diagnosis is desired to be considered and that is our friend Trench Mouth, Vincent's Angina, etc. The writer has heard of numerous blood tests being made for this without any results but the Abrams method has shown the reaction.

A blood specimen was sent to Dr. A. L. McGowan, of Dayton, O., of a case of trench mouth and he found the vibratory rate of acquired syphilis. Another specimen taken at the same time and from same patient was tested by Dr. H. J. Pierce, of Greenville, O., in the presence of the writer and this showed the same result. It is unfortunate that the ohmage was not measured but this will be done later.

A man who had been treated for trench mouth about three or four months ago submitted to the taking of a blood specimen which was tested and showed same result as others and the ohmage was seven. This last test was not under favorable conditions and will be made again to insure accuracy for future data.

Now the question arises can we be infected by syphilis without any more evidence than in trench mouth and does it remain in our systems as does the Bovine Lues? Can we have an infection of this disease which has in the past eluded our endeavors to show it by the tests we have been using?

If these vibratory rates of diseases show to us new conditions and open up new lines of advancement will the dental profession be exonerated from some of the blame that the medical profession has been attaching to us, and will this act as a boomerang and return to them?

If these methods are correct we have been laboring under misrepresentations and will be able to make an advance on pyorrhea that we have not been able to in the past.

The use of the Osciloclast in these cases may show us how the system may be cleared of conditions heretofore unknown and it will be well for the dental profession to watch closely the results of these various cases as our future advancement as a profession may be determined, and we should be thoroughly conversant with this method.

Dr. Abrams, a physician, may be the man to exonerate us, and from all that has been seen by the writer in following the diagnosis and treatment, it appears that this is a marvelous discovery and a revolution in medical treatment is impending.

AN OUTLINE OF THE THEORY AND PRACTICE OF PARTIAL DENTURE SERVICE*

BY W. E. CUMMER, D.D.S., TORONTO, CANADA.

EXPLANATORY NOTE

1. *Partial Denture Service*, includes (a) *Theory*, defined as "the classified knowledge of the subject" (Wilson) and (b) *Practice*, the use of this classified knowledge in guiding the hands in the various handicraft-operations necessary in the replacement of lost teeth.

2. *The Theory of Partial Denture Service* is made up chiefly of a working knowledge of the

(a) Natural structures and functions to be restored (gross and minute), including their probable behavior when subject to unusual stresses.

(b) Standardized parts, which when brought into proper juxtaposition, will result in an appliance which will

1. Restore structures and functions as may be by human agency.

2. Prevent further injury to structures and functions.

(c) Prevention of injuries to these parts—

1. Injuries which naturally result in the loss of teeth.

2. Injuries from improperly-designed and constructed artificial parts.

3. *The Practice of Partial Denture Service*. Having acquired, and mentally classified the above theoretical principles, these may be used

*Presented before the Northern Ohio Dental Association, Cleveland, June, 1922.

as a guide to correct manipulation in the Practice of Partial Denture Service. Practice is made up of four stages: Design, Construction, Installation and Maintenance.

4. *Design.* A mental or graphic picture must precede all engineering construction. In partial denture design the theoretical prin-

Chart #1

PARTIAL DENTURE SERVICE

(continued) ROYAL COLLEGE DENTAL SURGEONS

THEORY OF PARTIAL DENTURE SERVICE :- A Working Knowledge of:-

A. RESTORATION

1. Structures to be restored { 1. Teeth
2. Associate parts.
2. Functions to be restored { 1. 1st step in digestion { 1. Mastication
2. Speech & Voice { 2. Insalivation
3. Expression. { 3. Deglutition.

B. STANDARDIZED PARTS, WHICH, IN PROPER ASSEMBLY, WILL :-

3. Restore Structure and Function as may be by Human Agencies
4. Prevent further injuries to Structure and Function as may be by Human Agencies

C. PREVENTION

5. Injuries as result of extraction by good appliances preventable { 1. Drifting
2. Exfoliation
3. Excessive Stress & Wear
4. Stagnation.

STRUCTURES

1. Enamel, Dentine and Cementum :- intensive caries production, erosion and wear, from capillarity
2. Gingivae :- impingement and interference.
3. Mucosa and subjacent bone :- overload.
4. " " :- strangulation.
5. Pericementum and mucosa, with subjacent bone :- overload.
6. Pericementum :- overload.
7. " " :- torque, vertical.
8. " " :- torque, horizontal.
9. " " :- incline plane, (wedge) mesio-distal
10. " " :- incline plane, Bucco-lingual.
11. " " :- incline plane, M.D. B.L.
12. " " :- incline plane, axial.
13. " " :- lever 1st class (shears)
14. " " :- " 2nd " (nut cracker)
15. " " :- " 3rd " (flask rings)
16. Pericementum, combinations of all mechanical advantages.
17. Dental pulp and periapical tissues, various injuries.
18. Cheeks, tongue and soft tissues, impingement and irritation, leading possibly to malignancy.

3
out
of
5
M.A.

6. Injuries as result of faulty appliances preventable by good appliances.
(Presupposing Healthy Mouth)

FUNCTIONS.

19. Mastication and ultimate digestion, various injuries.
20. Speech and voice, lisping, thick speech and etc.
21. Hearing, interference with.

BOTH STRUCTURES AND FUNCTIONS.

22. Any or all of above injuries, from lack of systematic maintenance.

Fig. 1—Duplicate of chart as shown. Note three divisions of theoretical knowledge—A. B. C. with detail.

ciples are made use of as needed in the development of design. The main item of practical value of this demonstration is that of a mental

and graphic technic for the development of any design for any combination of teeth in four simple stages.

5. *Construction.* Having developed mentally or on paper the correct design, the next step is that of actual construction. Accuracy, lightness, small bulk as possible, rapidity, ease, and low cost are of primary importance. In the opinion of the writer, much research and invention are needed here.

6. *Installation.* Many a fine piece of well-designed and constructed prosthetic work is a failure for the sole reason of lack of care in installation. Hence the importance of this step.

7. *Maintenance and Repair.* Many a piece of well-designed, constructed and installed prosthetic work becomes a failure for the sole reason of improper maintenance and prompt necessary repairs. The patient here divides the responsibility with the dentist. Hence also the importance of this step.

THEORY

1. RESTORATION

It is manifestly impossible to attempt the restoration of structures and functions wholly and partially lost without an intimate knowledge of each of these, both gross and minute. The necessity of subjecting both the teeth and associate tissues to unusual stresses requires a knowledge of the probable behavior of these tissues under these stresses in order to utilize these tissues as much as possible and avoid overload. Incidentally the dental profession requires a very considerable amount of data on this probable behavior of tissues under various loads, from research investigation not yet done.

2. STANDARDIZED PARTS

In manufacturing practice, standardized products are assembled by the juxtaposition of standardized parts by manufacturing processes. This juxtaposition may be varied for special needs or uses; for example, a variation in the juxtaposition of parts of an automobile will result in a variety of the product, with a proportion of the parts identical in each.

In partial denture design the process is a mental or mental-graphic one with a mental store house of six classes of standardized parts located in the mind of the dentist as a result of his theoretical studies. This forms the second branch of the theory of partial denture service as may be noted in detail in *Fig.2*.

3. BASES, ATTACHMENTS, TEETH

The *base*, or that part in contact with the mucosa, includes the saddles and parts connecting saddles, discussed under Design, steps 1 and 2. Vulcanite as a material is indicated in cases which may require rebasing, especially after recent extraction. The *attachment* here describes that element which joins the teeth to the base, usually vulcanite, occasionally gold (with tube teeth, crowns, or similar). The

PARTIAL DENTURE SERVICE

THEORY OF PARTIAL DENTURE SERVICE (Continued)

Chart '2.
ROYAL COLLEGE DENTAL SURGEONS

STANDARDIZED PARTS

— A Working Knowledge Including Indications and Contra-Indications of —

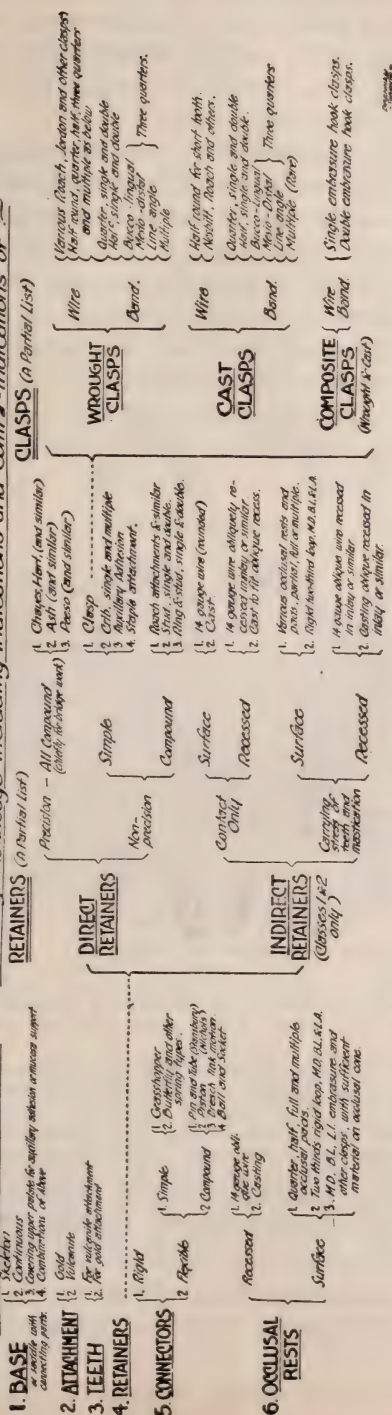


Fig. 2—Chart of standardized parts as shown. A working knowledge of these having been acquired, their juxtaposition may be easily accomplished as noted in text, in four simple stages—

1. Saddles
2. Parts connecting saddles
3. Retention
4. Occlusal rests

teeth used are usually vulcanite pin teeth, detachable facings or tube teeth. The sulcus angle of these teeth should be made to correspond with that of the remaining teeth, and all of the detail of marginal and transverse ridges, grooves, etc., should be present to allow the escape of cut food and prevent overload.

4. RETENTION, AND OBJECTIVES IN RETENTION

All that is required in retention of any artificial restoration is fixation sufficient to oppose gravity or the displacing effect of mastication. Gravity in uppers is very slight, a matter of ounces, and the bulk of masticating force tends to seat the denture in position. Hence only a slight retentive force is necessary, except in small removable bridges, which may be swallowed, in which the retentive force should be positive, requiring some effort to remove.

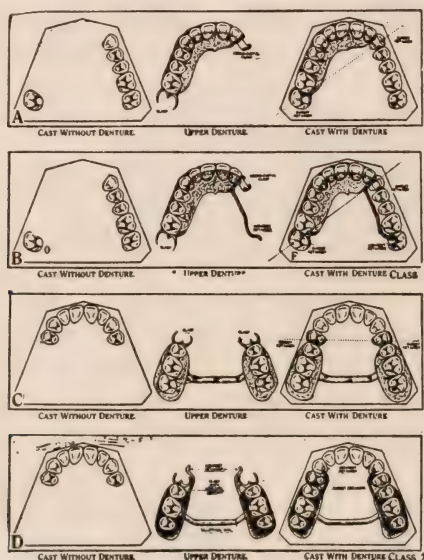


Fig. 3—Indirect Retention.

A shows a restoration which would be unsuccessful because the fulcrum line lies to one side of the center of gravity of the piece, and the saddle in the cuspid region would be unstable.

B shows the restoration A corrected by a 14-gauge extension reaching to the second molar at a horizontal point on the occlusal surface at which the articulation will admit. This brings the center of gravity coincident with the fulcrum line, and stabilizes the unsupported part of the saddle (the cuspid region). The above is an example of class one with direct retainers diagonally opposite.

C, a class two restoration (with direct retainers diametrically opposite), unsuccessful because the fulcrum line lies outside the center of gravity.

D, same as C, corrected by indirect retention bringing the center of gravity coincident with the fulcrum line. As noted in Fig. 5, indirect retainers are of various types, contact only, and also carrying teeth, restoring spaces, etc.

Obviously the piece should be retained so far as possible at the center of gravity. In addition to this the following objectives may be noted:

- (a) Use of simple retainer (as clasps) instead of compound retainers, (as Roach attachments, etc.) as far as possible for both preventive and economic reasons.

- (b) An effort to use only two retainers with fulcrum line (imaginary line between direct retainers) passing through the center of gravity restoration (Class 1-2-3) with or without indirect retainers. (*Fig. 3.*)
- (c) The use of three or more direct retainers if paired teeth may not be found opposite, with fulcrum line in center of gravity, or if a splint-support for teeth of impaired pericementum is required.

5. DIRECT RETAINERS

Retainers are subdivided direct and indirect, direct retainers such as clasps and similar applying the retentive force directly at the point of application. As noted in *Fig. 2* these are *simple* (as clasps, cribs, etc.) and *compound* (as Roach, ring and stud, etc.) The simple retainers are preferable over compound retainers because no cutting of tooth tissue is necessary. Compound retainers are indicated when excavation of tooth tissue is either necessary or already has been done.

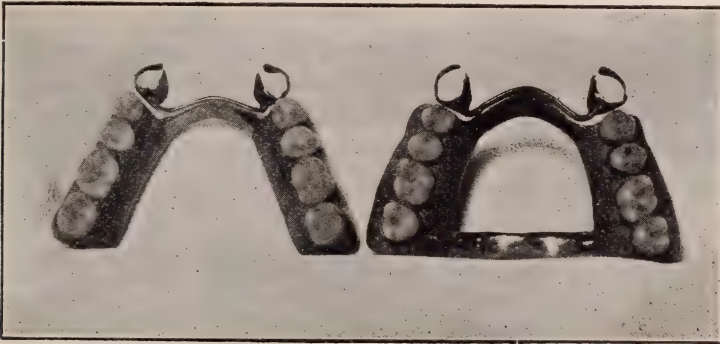


Fig. 4—A simple non-rigid connector (W. A. Giffen) of 18-gauge elastic wire. An independent saddle movement is here secured, but without support from adjacent teeth.

6. INDIRECT RETAINERS

Direct retainers should be ordinarily two in number and should be placed directly opposite with an imaginary line joining them (fulcrum line) passing through the center of gravity of the restoration. Frequently this is impossible because the fulcrum line joining the two teeth adjacent to the edentulous space may lie outside the center of gravity of the restoration. Hence an extension brought into contact with a suitable tooth remote from the unsupported part of the restoration will bring the fulcrum line to the center of the piece. These extensions are called indirect retainers as noted in *Fig. 3.*

7. CONNECTORS

In cases in which the pressure of mastication is either wholly carried by the teeth or roots or divided between these and the

mucosa, a 14-gauge wire soldered to the clasp, or other retainers, placed usually in the embrasure, (*Fig. 11*) and attached by solder to the balance of the frame work may be used.



Fig. 5—A compound non-rigid connector (Dresch). Mr. Dresch has stated that by the use of vulcanized rubber between the links, pressure may be divided between teeth and mucosa. Models furnished kindness of Dr. I. L. Furnas, Cleveland, Ohio.

Should, however, for such causes as flabby mucosa, few remaining teeth, or similar, it may be deemed unsafe to divide the pressure for fear of overload of the pericementum, non-rigid connectors may be used. Examples of two types are shown, rigid and non-rigid. (*Figs. 4 and 5.*)



Fig. 6—An instance of progressive drifting and exfoliation following extraction with increase of traumatic occlusion.

- (a) Before extraction.
- (b) Immediately after extraction, no traumatic occlusion.
- (c) Lower molar tipping forward and separating both upper and lower, bicuspid driving upper bicuspid distally.
- (d) The same condition only considerably worse, with exfoliation.
- (e) and (f) The same with separation of upper anterior. At any stage these progressive conditions could have been checked by well designed partial restorations.

8. OCCLUSAL RESTS

Occlusal rests if used transmit all or part of the pressure of mastication to the teeth and pericementum upon which they rest. These are of various types as noted in *Fig. 2* for various purposes, as noted hereinafter.

9. PREVENTION OF DRIFTING, EXFOLIATION, EXCESSIVE STRESS, WEAR AND STAGNATION

These changes following the loss of teeth are usually preventable by the immediate insertion of well-designed partial restorations, and are as follows:

1. Drifting, limited or extensive, usually with and occasionally without traumatic occlusion.
2. Exfoliation, limited or extensive, usually with or occasionally without traumatic occlusion.
3. Excessive stress and consequent wear on remaining teeth.
4. Stagnation of non-occluding teeth.

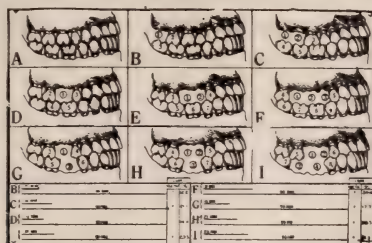


Fig. 7—Excessive stress and consequent wear. The approximate losses in area, hence masticating efficiency is indicated above.

- (a) Complete denture.
- (b) One tooth at the end of a series, loss approximately 12.2%.
- (c) Two teeth, loss approximately 21.1%.
- (d) One tooth in center of a series, loss approximately 23.3%.
- (e) Two teeth, loss approximately 23.3%.
- (f) Three teeth, loss approximately 34.4%.
- (g) Two teeth, loss approximately 17.7%.
- (h) Three teeth, loss approximately 23.3%.
- (i) Four teeth, loss approximately 31.1%.

In each case these losses indicate the same stress heretofore carried by the complete denture and now assumed by the remaining teeth. It might also be noted that, when a tooth is extracted from the center of a series the function of five others is interfered with as in (d), the function of Nos. 2, 3, 4, 5 is interfered with, with complete loss of function of the extracted tooth No. 1.



Fig. 8—A sample of stagnation, with Nature's tooth brush (*e.g.*, the passage of food over teeth driven by teeth and occlusion) absent. Especially with a lack of salivary balance, the above is apt to occur. Note difference, left and right elevation of cast.

10. LIST OF MOST FREQUENT CAUSES OF INJURY TO STRUCTURES, AND INTERFERENCE OF FUNCTIONS AS COMMONLY FOUND IN PARTIAL DENTURE DESIGN AND CONSTRUCTION, INSERTION AND MAINTENANCE (IN PART)

Here follows a list in part as enlarged from twenty-two items, Fig. 1, No. 6 (injuries as the result of faulty appliances), with most

frequent examples of each. It may be noted that, capillarity, impingement, interference, and the three out of the five mechanical advantages (torques, levers and incline planes) include all of these destructive forces.

STRUCTURES

11. ENAMEL, DENTIN AND CEMENTUM, INTENSIVE CARIES

PRODUCTION, EROSION AND WEAR

- (a) Capillary retention against enamel, (faulty or at fissures) from clasps, occlusal rest, or pads causing intensive caries production.
- (b) Capillary retention against dentin by clasp, pad, or other constructional parts, causing intensive caries production.
- (c) Capillary retention against cementum by clasps, base or other constructional parts, causing intensive caries production.
- (d) Clasps and other parts over inlay margin, causing intensive caries production.
- (e) Clasps and other parts over eroded areas, causing further erosion, caries or both.
- (f) Abrasion, usually from porcelain in overload relation to abraded teeth.
- (g) Attrition, usually from natural teeth in overload.
- (h) Use of compound retainers rather than simple, resulting in unnecessary destruction of tooth tissue.
- (i) Unnecessary number and contact area of direct retainers.

12. GINGIVA, IMPINGEMENT AND INTERFERENCE

- (a) Impingement against gingival margin, or septal gingiva by clasps, etc.
- (b) Impingement against gingival margin, or septal gingiva by saddle and other constructional parts.
- (c) Impingement against gingival margin, or septal gingiva by "settling" clasps and saddles, especially after recent extraction.
- (d) Interference from unprotected gingival margin and septal gingiva from lack of occlusal protective contours, such as marginal ridges, cusps, etc.
- (e) Interference from unprotected gingival margin, and from septal gingiva from lack of axial protective contours.

13. MUCOSA AND SUBJACENT BONE, OVERLOAD

- (a) Overload from small saddle area in proportion to mastication area, and pressure, without occlusal rests.
- (b) Local overload, improper muscle trimming, saddle outline, etc.
- (c) Local overload from incorrect forecast of compensation for hard areas, and settling.
- (d) Overload of mucosa from relation of direct retainer and mucosa with too much pressure on mucosa.

14. MUCOSA AND SUBJACENT BONE, STRANGULATION.

- (a) Parallel wrought and cast clasps, connectors, and compound

retainers which do not release after pressure applied from too tight construction, etc.

- (b) Clasps with excess towards gingival cone.
- (c) Indirect retainers adjusted too tight.
- (d) Overloads on mucosa as above.
- (e) Relations between saddles and direct retainers giving mucosa too much pressure.

15. PERICEMENTUM AND MUCOSA, WITH SUBJACENT BONE OVERLOAD

- (a) Local overload, from warpage in construction and too great pressure at one or more points.
- (b) Overload, from lack of escape grooves, with flat cutting contacts rather than line contacts.
- (c) Overload from all constructional parts preventing exact central occlusion.

16. PERICEMENTUM, OVERLOAD

- (a) Overload from occlusal rests, from expected absorption (especially after recent extraction) with no rebasing.
- (b) Overload from large saddle area, with occlusal rests.
- (c) Overload from medium saddle area, soft mucosa, with occlusal rests.
- (d) Clasps without occlusal rests too heavy to admit of "slip" especially with soft mucosa.

17. PERICEMENTUM TORQUE, VERTICAL

- (a) Cast clasps too wide on free saddle.
- (b) Cast clasps too thick on free saddle.
- (c) Cast clasps (B.L.) wide body on free saddle.
- (d) Cast clasps (M.D.) too wide at free ends and attached to free saddle.
- (e) Cast clasps (B.L.) too thick at free ends and attached to free saddle.
- (f) Cast clasps (L.A.) attached to free saddles as above.
- (g) Reinforced wrought clasp attached to free saddle as above.
- (h) Improper relief on all clasps (E. G. right angles to fulcrum line).

18. PERICEMENTUM TORQUE, HORIZONTAL

- (a) Cast clasps on single teeth.

19. PERICEMENTUM INCLINE PLANE, (WEDGE) MESIO-DISTAL

- (a) Interfering embrasure hooks above contact point.
- (b) Connectors improperly soldered to free end of clasps.
- (c) Too much solder, connector to clasp.
- (d) Occlusal rest too short and on incline plane.
- (e) Improperly-placed rigid connectors on leaning teeth.
- (f) Improperly-placed clasp bodies.
- (g) Rigid 2-3 loops too short.

20. PERICEMENTUM, INCLINE PLANES, BUCCO-LINGUAL

- (a) Indirect retainers on incline planes without occlusal rests on direct retainers.
- (b) Improperly-placed rigid connectors on leaning teeth.
- (c) Improperly-placed clasp bodies.
- (d) Skeleton work too rigid.

21. PERICEMENTUM, INCLINE PLANE, M.D.B.L.

- (a) Teeth interfering with occlusion.
- (b) Teeth interfering with articulation.
- (c) Parts interfering with occlusion.
- (d) Parts interfering with articulation.
- (e) Shrinkage and distortion of metallic frame-work.
- (f) Contours too full, inlays, crowns, etc.

22. PERICEMENTUM, INCLINE PLANE, AXIAL

- (a) Clasp above or below line of widest cross section.
- (b) Rebound of displaced mucosa, with relation of direct retainers and mucosa too close without occlusal rests.

23. PERICEMENTUM, LEVER 1ST CLASS

- (a) Indirect retainers too tightly adjusted.
- (b) Cast multiple clasps on single groups of teeth.
- (c) Indirect retainer too close to fulcrum line.
- (d) Teeth set outside ridge.
- (e) Class 4 cases with free saddle on soft mucosa.

24. PERICEMENTUM, LEVER 2ND CLASS

- (a) Cast multiple clasps on single groups of teeth.

25. PERICEMENTUM, LEVER 3RD CLASS

Indirect retainers, no occlusal rest on direct retainer. (Remainder of mechanical advantages, *i.e.*, screw and pulley, not found).

26. PERICEMENTUM, COMBINATIONS OF ANY OR ALL
MECHANICAL ADVANTAGES

- (a) Cast clasps with rigid connectors on flabby mucosa, without provision for correlation of movement of saddle and anchor tooth.

27. THE DENTAL PULP, PERIAPICAL TISSUES, VARIOUS INJURIES

Because of the interdependence of the dental pulp, pericementum, dentin, enamel, cementum and gingival tissues, injuries to the dental pulp, followed by diseases of the dental pulp, may occur from any or all of the foregoing causes.

28. CHEEKS, TONGUE AND SOFT TISSUE, IMPINGEMENT AND IRRITATION,
LEADING POSSIBLY TO MALIGNANCY

- (a) Improper overhang to prevent tongue and cheeks biting.
- (b) Positioning of constructional parts not close enough to prevent irritation to tongue and cheeks.
- (c) Improper finishing, rounding off of sharp edges, elimination of feather edges, etc., (should include a study of the microscopy of the polished and aseptic surfaces).

FUNCTION

Injuries may result from lack of application of all known principles, especially in:

29. MASTICATION AND ULTIMATE DIGESTION, ETC., VARIOUS INJURIES

(a) All missing teeth and surfaces not supplied, (for example with special occlusal pads to secure greatest masticating surface).

(b) Lack of anatomical articulation on partials, (various mechanical advantages as before mentioned).

(c) Lack of positive retention in small pieces and danger of swallowing of piece.

30. SPEECH AND VOICE, LISPING, THICK SPEECH, ETC.

(a) Parts crossing ahead of bicuspid to be between rugae or failing this, wide flat cast or swage pieces (avoiding lispings, etc.)

(b) Parts crossing distal to first molar, bar or similar not crossing approximately opposite to the second molar (causing thickening of speech).

(c) Parts not close to mucosa (causing both lispings and indistinct enunciation).

31. HEARING, INTERFERENCE WITH

(a) Neglect of sufficient intermaxillary distance in restoration, (may interfere with opening of meatus by condyle tipping back and causing obstruction. See literature, Monson, Wright, and others).

BOTH STRUCTURE AND FUNCTION

Almost all of the foregoing injuries to structure and function may occur, or may be aggravated through breakage, settling, or other contingencies difficult or impossible to foresee. After insertion these may be prevented by proper inspection and maintenance including the following:

32. MAINTENANCE, (THE PATIENT'S PART)

(a) Cleansing five times per day.

(b) Saliva flush.

(c) Removal at night.

(d) Use of notification system for periodic examination furnished by dentist.

(e) Prompt repairs if necessary.

(f) Study of suitable literature provided by dentist.

PRACTICE OF PARTIAL DENTURE SERVICE

33. SUBJECT MATTER, GENERAL

The practice of partial denture service consists of :

(a) Examination of the semi-edentulous patient for discovery of the details which have a bearing on the case.

(b) The notation of the injuries consequent on extraction to be prevented or avoided.

Chart *3.

PARTIAL DENTURE SERVICE

ROYAL COLLEGE DENTAL SURGEONS

PRACTICE OF PARTIAL DENTURE SERVICE :-Choice and execution of:-

(Presupposing Mastery of Theory and of Necessary Handicraft and with mouth "made ready")

PRELIMINARY

1. General Examination
(If required, by Physician)
2. Dental Examination

1. Charts
2. Study Models
3. Both or neither
4. Order of Examination
(With or without radiographs)

DESIGN

1. Saddles
(Allocation Load to Mucosa)
2. Parts connecting saddles
3. Direct and Indirect Retention and Connectors
4. Occlusal Rests
(Allocation of load to teeth and their pericementa)

1. Skeleton
2. Continuous
3. Upper Perforal
4. Combination of Above

1. Cast
2. Wire or plate, wrought
3. Wire, pure gold, solder built up.
4. Combinations of the above.

1. Class 1. - D & I.R. X (2D)
2. " 2. - D & I.R. - (2D)
3. " 3. - D.R. - (2D)
4. " 4. - D.R. Δ Δ (3+D)

1. Recessed
2. Surface, including, Partial, Full and Multiple occlusal rests and pads, and rests for occlusal cone

CONSTRUCTION (PRECISION)

1. Direct retainers and Occlusal rests completed, checked for interference, and in mouth.
2. Impression
Preferably Muscle-trimmed
3. Cast
4. Assembly
(with all metal parts joined & solder)
(Determine sequence in insertion; one, two or three directions)
5. Checking above in mouth
(spot grinding if necessary)
6. Anterior Teeth :-applied Esthetics
7. Posterior Teeth :-Articulation and Occlusion.
8. Checking in mouth, in wax mount.
9. Finishing.

1. All plaster
2. Plaster, sectional method.
3. Plaster and compound, sectional method.
4. Dr. Furnas' Method.
1. Stone, with wax reliefs for undercut parts, Indirect assembly.
2. Investment, Material for direct assembly.

1. Indirect, off cast
2. Direct, on cast (with loss of cast)

1. Vulcanite with temporary wax base
2. Metal, as to be finished.

INSERTION OR INSTALLATION

1. Before piece snaps "home" Carbon paper and spot-grinding
2. After piece snaps "home" (final allocation of load) Carbon paper and spot-grinding;
Teach patient and have patient practice insertion and removal before leaving
3. Subsequent Adjustment and Repasing at subsequent sittings, full load is properly distributed.

MAINTENANCE (The Patients Part)

1. General Oral Health :-Diet, exercise, Elimination, Immunity etc
2. Saliva Flush & Cleansing 5 times per day.
3. Removal night
4. Notification
5. Repairs: (a) Fractures & simple replacements (Prompt)
(b) Additions for teeth lost
(c) Other repairs
6. Literature for patients covering above.

Fig. 9—Chart on Partial Denture Service as shown. Note four stages, with detail as subsequently described.

- (c) The most favorable juxtaposition of standardized parts with which to accomplish this purpose.

After the preliminary examination, follows the practical application of the theory previously acquired to the special condition found in the mouth of the semi-edentulous patient. This detail may be best redistributed in an engineering sequence as follows:

- (a) Design
 - (b) Construction
 - (c) Installation or insertion
 - (d) Maintenance and repair
- (d) The subsequent phases of construction, installation, and maintenance, in which details of prevention constantly recur.

34. PRELIMINARY EXAMINATION

This may be done in part, or, if consultation with specialist difficult or impossible, in whole by the attending dentist. A suggested sequence for which follows:

HISTORY

1. Questioning of patient as to any pathological condition outside of mouth; if apparently present reference to physician for examination.

OBJECTIVE SYMPTOMS

2. General dental examination for all dental disease, which may or may not give rise to systemic disease as above, with or without radiographs. If obscure, preferably by expert dental diagnostician.

SUBJECTIVE SYMPTOMS

3. Particular dental examination, and consultation with, and treatment from, if necessary.
 - (a) Preventologist—Various items as elimination of predisposition to dental disease, etc. No restoration may be begun with any assurance of success while predisposition to dental disease exists in the mouth.
 - (b) Periodontist—Various items, as probable condition of pericementum under stress, relief from overload, disposition of stresses, etc.
 - (c) Orthodontist—Various items, as preference of orthodontic treatment over prosthetic, combined orthodontic and prosthetic treatment, inclusion of orthodontic appliances as retainers in prosthetic appliances, etc.
 - (d) Oral Surgeon—Various items, as preference of surgical treatment over prosthetic, combined surgical and prosthetic treatment, etc.
 - (e) Exodontist—Character of mucosa support which will probably follow extraction and possible alveolectomy to improve these. Indications of alveolectomy with prosthetic restorations for esthetics, etc.

(f) Any or all of above.

In all cases certain preliminaries, as charts, models, etc., may be necessary, previous to special examination for prosthetic work. Here follows a list indicating the use or non-use of these: .

1. None—Simple cases evident on inspection.
2. Charts only—Simple cases not evident on inspection.
3. Charts and study models—More difficult cases not evident on inspection, with marked variations from normal of condition and position of teeth not readily noted on charts.
(Variations on a horizontal plane only).
4. Upper and lower study models—Ditto with marked variations of position of teeth between upper and lower jaws. (Variations on a vertical and horizontal plane).
5. Upper and lower study models mounted on articulator from bite blocks—Ditto when sufficient facets are not present for securing the occlusal position.

Here follows a special dental examination for denture design and specification (after Prothero) in which various items are noted for further use in design and specifications, construction, installation, and maintenance.

1. Number and location of remaining teeth and spaces. Note these on chart, step No. 1, design.
2. Condition of remaining teeth.
3. Condition of mouth and mucous membrane.
4. Condition of alveolar border, extent of absorption, location of muscular attachments and frena.
5. Condition, location and extent, hard and soft areas.
6. Relation of upper and lower ridge.
7. Condition of saliva.

35. DESIGN AND ITS DEFINITION

A design of a partial restoration is:

- (a) Mental picture, or,
- (b) Mento-graphic supplemented by drawing of the proposed restoration which should be, as far as possible completed before any material is collected or work begun.

The mental process in design involves:

- (a) A mental store house of the pictures of the standardized parts from which all partial dentures may be constructed, acquired from theoretical studies, as already noted.
- (b) A knowledge as to their correct use, *i.e.*, the greatest functional efficiency and least destructive tendency upon natural teeth also acquired from the theoretical studies.
- (c) Examination for discovery of conditions peculiar to case.
- (d) A simple working procedure in securing above mentioned mental or graphic pictures, suitable for case in hand.

36. STEPS IN DESIGN

The writer's hypothesis (2¹⁶ check) is that dentists and students may best learn to design all partial dentures above a certain grade of difficulty by a graphic method, (involving the use of a rubber stamp C. W. Mack & Co., 42 Adelaide West, \$2.50, or printed chart of fourteen teeth) in *four definite and distinct steps* in which the above mentioned preventive considerations continually recur in redistributed order.

1. Saddles
2. (0) Parts connecting saddles.
3. (4) Direct and indirect retention and connectors. (At this stage the case is classified).
4. (3) Occlusal rests if indicated (this order subject to variations.)

For simple cases both charts and models may be omitted. While in complex cases especially those in which the bite must be lengthened, both charts, study models articulated and the presence of the patients are sometimes required in order to develop a design.

37. SADDLE DESIGN

Allocation of Load to Mucosa

In the design of saddles, the mucosa is given its share of the load. The softer the mucosa the larger should be the saddle. A slightly intermittent pressure is more favorable, and a steady pressure in excess compresses the circulation, causes a so-called "strangulation" with absorption similar to too great peripheral valve seal on full dentures.

In outline the saddles should be kept away from the gingival margin. With regard to saddle-area, Dr. Chayé's statement of "saddle's area must equal combined pericemental areas of teeth missing and supplied" probably approaches close to the solution (*Items of Interest*, November, 1915). Professional knowledge regarding this fundamental exists almost entirely from professional experience, more or less definite. Until research on proper loading of mucosa, proper loading of teeth and correlation of saddles and tooth movement is done, partial dentures will continue to wreck teeth. In the opinion of the writer the subject is so lacking in accurate data that a series of factors to be weighed in the choice of support (mucosa, root, or combination is all that is available). (*Fig. 12.*) Below follows steps in saddle design:

Upper and Lower

1. Buccal, periphery, posterior, to be carried to peripheral valve seal.
2. Buccal and labial periphery, anterior, as above unless no artificial gum is desired.
3. About teeth 1-2mm space to avoid capillarity.
4. Lingual periphery as determined by area of mucosa support desired and in the next step. (Parts connecting saddles).

38. PARTS CONNECTING SADDLES

These (when required) are almost always located to the lingual of the teeth, occasionally buccal and labial, and may be developed as below.

Upper and Lower

1. If alternate space and tooth, or similar, use continuous construction.
2. If alternate space and group of teeth, or similar, use skeleton construction.

Upper

3. If parts required to cross anterior, flat or semi-round, cast or wrought, and placed in a suitable depression between rugae. If this not possible, flat wide piece.
4. If parts required to cross posterior, between first and second molar, cast or wrought, flat or semi-round, depending upon grade, and compensated for differences between hard and soft areas.
- 4a. Choice between anterior, posterior, or both. This depending on strength of appliance required, range, available space, occupation and choice of patient, and other factors.

If Soft Mucosa, Upper

5. All saddles should be extended to cover mucosa on working side of fulcrum line over entire vault.

Lower

6. All parts connecting lower saddles, lingual bar, low as muscle attachment will permit. and one or two mm. lingual from soft tissues.

39. POSITION AND CHOICE, RETAINING DEVICES (AT WHICH STEP THE CASE BECOMES CLASSIFIED)

Under this head the clasp of smallest dimension consistent with efficiency to reduce capillarity is preferred, if possible two only in number (classes 1-2-3). Cast clasps should not be used in locations causing torques. And the writer notes with pleasure the increasing popularity of clasps of narrower contacts from the writings of Dr. Roach and others. A suggested detail for the positioning and choice of retainers follows:

1. With small straight edge to hand, choose paired (classes 1-2-3) or triplet, (class 4) in the following steps.
 - (a) Lay straight edge across opposite pairs of natural teeth adjacent to edentulous spaces, so as to allow the straight edge to pass across the center of area of figures outlined in steps 1 and 2 (usually omitting central, lateral and third molars). Classes 1 and 2.

This being inexpedient:

a free saddle, (a saddle directly retained at one end only) resting in turn upon soft mucosa. This is the most frequent example of the main contra-indication of the cast clasp, *viz*: "Cast clasps must not be used in any instance which, because of relative non-resiliency, and consequent lack of slip they may subject an anchor tooth to vertical or horizontal torques from free saddles on mucosa of any degree of compressibility."

Cast clasps find a special use in short spaces with suitable teeth for clasps at each end of space, in which wrought clasps are contra-indicated because of danger of swallowing.

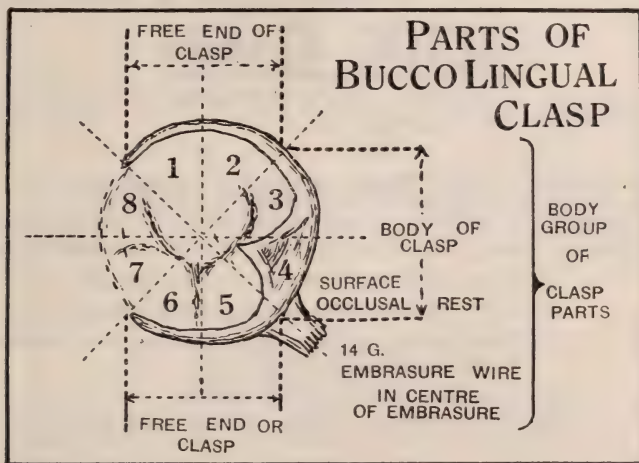


Fig. 11—Parts of a bucco-lingual clasp. The arrangement varies in other types to a certain extent. Note the clasp ordinarily encircles 6-8 or $\frac{3}{4}$ the circumference of the teeth. Parts of clasp as above noted. Note position of 14-gauge connector in embrasure.

Under the latter circumstances, the wrought (preferably) wire band or composite clasp is indicated, which ordinarily possesses sufficient slip and elasticity to accommodate this difference or movement, and within extreme cases non-rigid connectors.

Notes on Design of Individual Clasps

All clasps consist of:

- (a) Two resilient and contoured free ends or their equivalent, equidistant above and below line of widest cross section.
- (b) A body connecting the free ends which is more or less resilient. The proper position of the contoured free ends is that of conformation to the contours of the pair opposing convex surfaces as chosen, resulting in a positive grip, assisted by tenso-friction, *not more than sufficient to hold the restoration to place.*

Body must be (a) below leaning tooth surfaces; (b) narrow especially at right angles to fulcrum line.

41. CONNECTORS

These may be of 14-gauge wire placed in the embrasure except in cases in which extreme disproportion exists between the movements of the saddle and anchor tooth, or for other reasons. In such cases non-rigid connectors may be used, as Giffen, Nicholls, Weinstein, Dresch, or similar. See Figs. 2, 7, 8.

Chart #4

PARTIAL DENTURE SERVICE

ROYAL COLLEGE OF DENTAL SURGEONS

FACTOR CHART

For the purpose of assisting in the determination of support, (steps #1's 1, 2 & 4) Design, Chart #3.

1. SOME FACTORS INDICATING MUCOSA SUPPORT :-

Larger saddle areas with stress of mastication carried primarily by saddles and subjacent mucosa, and without occlusal rests are indicated in proportion to :-

- (a) *Larger distances on each side of remaining teeth.*
- (b) *Smaller amount of pericementum available for support.*
- (c) *Less favorable condition of pericementum of teeth available, or not available for support.*
- (d) *Less firm condition of the mucosa.*
- (e) *Pressure from the antagonizing teeth above the average.*

2. SOME FACTORS INDICATING ROOT SUPPORT :-

Smaller saddles with stress of mastication carried primarily by the teeth and their pericementa; and with occlusal rests, are indicated in proportion to :-

- (a) *Smaller distance between the remaining teeth.*
- (b) *Larger amount of pericementum of teeth available for support.*
- (c) *More favorable condition of pericementum of teeth available for support.*
- (d) *More firm condition of the mucosa.*
- (e) *Pressure from antagonizing teeth below the average*

3. SOME FACTORS INDICATING COMBINATION SUPPORT :-

with stress of mastication divided between roots and mucosa, with saddles of medium area and with occlusal rests.

- (a) *Practically the remainder of the 2¹⁶ cases.*

(P.S. The above hypothetical and subject to checking with 2¹⁶ combinations)

Fig. 12—Factor Sheet. From the above, in proportion to the factors above, and present in the proposed restoration, is the type support chosen.

- (a) Root
- (b) Mucosa
- (c) Combination support of both root and mucosa.

42. POSITION AND CHOICE OF OCCLUSAL RESTS

(Allocation of load to the teeth and their pericementa. Load *must be applied to teeth coincident with their long axes only.*)

At this stage the occlusal rests, (if their use is thought desirable) may be drawn in, which allocates a load to the teeth. This is also an unexplored field, and in the judgment of the writer is best taught by factors indicating root support as attached, (*Fig. 12*). Governed by the general principles, that saddles resting on soft mucosa tend to throw bulk of the stress on the teeth, and also that teeth of diminished or diseased pericementum should not be given this duty. Some writers on this subject condemn this principle, thus eliminating the allocation of the load for the tissues designed by nature for the purpose; the dental pericementum—in which the writer is unable to wholly concur.

In many cases the sequelae following non-occlusion may be prevented with large occlusal rests. Capillarity in these may be minimized by keeping the gold out of contact with the deep sulci.

A sequence for the development of these follows:

1. Determine support of piece; see factor chart *Fig. 12*.
2. Sketching in occlusal rests.
 - (a) If mucosa support no occlusal rest.
 - (b) If root support entirely (removable bridges) occlusal rests, *Fig. 2*, with or without saddles.
 - (c) If mucosa and root support with *ample space* for occlusal rest: quarter, half, full, or multiple occlusal pads as required to close space.
 - (d) If both mucosa and root support with *small space* for occlusal rest; buccal or lingual entry surface occlusal rest: M.D., B.L., or L.I., rigid loops; recessed occlusal rests. Remove small amount of enamel from marginal ridges of upper and lower teeth involved, if absolutely unavoidable, and without approaching the dentin.

Note. Usually all teeth adjacent to spaces must share support.

Note. All M.D. clasps and B.L. and L.A. clasps considerably covering occlusal cone of tooth attached act as occlusal rests.

Note. Upon all uncut cone-shaped teeth (*e.g.*, cuspids) either M.D.—B.L.—or L. 1 rigid 2-3 loops are indicated.

43. CONSTRUCTION

Maintenance of accuracy is the chief difficulty in construction and much research in stresses and strains in bent and cast metal to avoid distortion is necessary. A shrunken casting or distorted framework exerts a permanent stress on anchor teeth which must result in ruin. Interference in anatomical articulation may be checked by intelligent use of adjustable articulators and the Wadsworth attachment is recommended with sulcus angles of natural and artificial teeth to be identical. Escapes provided on occlusal surface tend to reduce over-

load. In *Fig. 6* a series of items in construction may be noted, details of which would fill an essay of considerable size.

44. INSERTION OR INSTALLATION

Too much stress cannot be laid on the necessity for proper adjustment at this stage, both before, immediately after, and for a short time subsequent and during the initial stages of the practical use of

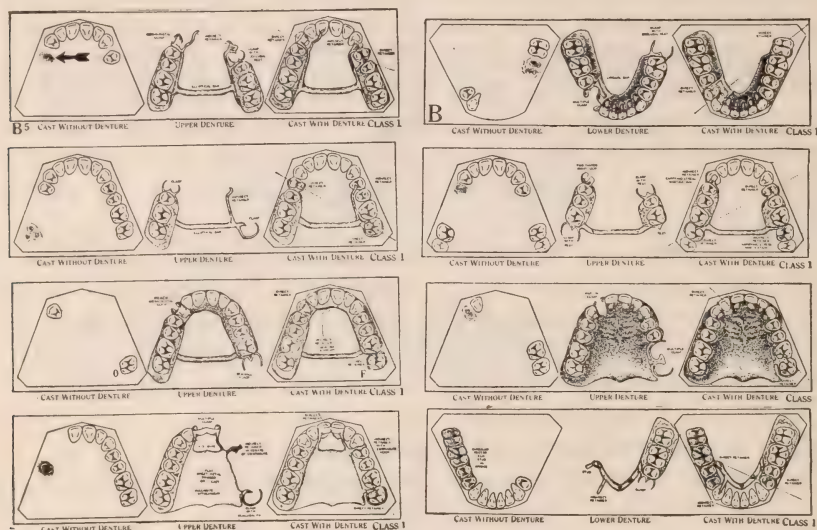


Fig. 13—A group of class 1 cases.

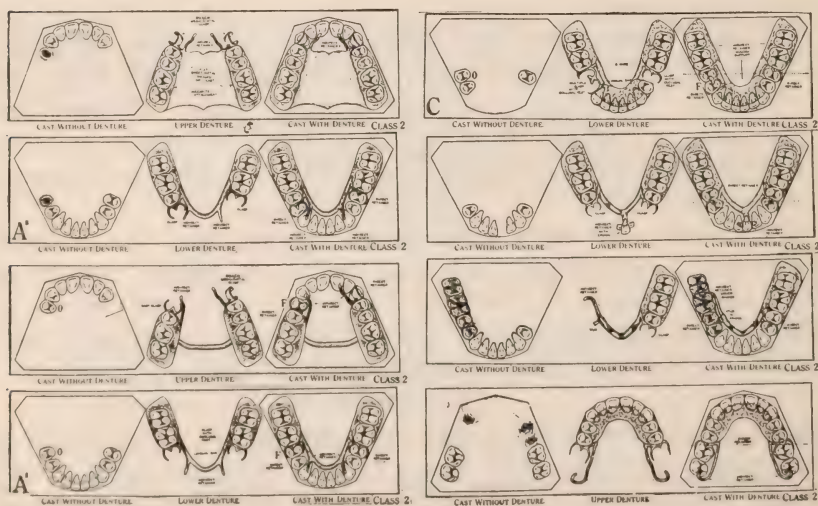


Fig. 14—A group of class 2 cases.

the appliance. At this stage the final and accurate distribution of stresses on teeth, mucosa, or both, is done, and to a large extent, the life history of the remaining teeth is determined. The operation

may be conducted entirely by the use of thin wax, carbon paper, and spotgrinding.

45. MAINTENANCE AND REPAIR.

(Presupposing healthy oral conditions).

Preventive items (in part). (The dentist's part.)

- (1) Settling clasps and saddles, gingival impingement, etc., correction.
- (2) Correction of impingement hard area or elsewhere.
- (3) Watching for overload from occlusal rest with no rebasing in expected absorptions (especially after recent extraction); and for various overloads not correctly anticipated in saddle and occlusal rest designs.

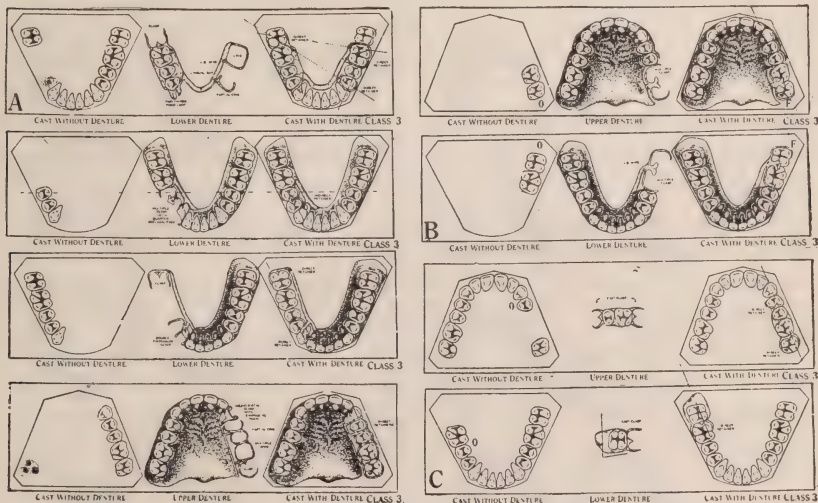


Fig. 15—A group of class 3 cases.

Oral Health Conditions. (The patient's part.)

- (a) Cleansing five times per day.
- (b) Saliva flush
- (c) Removal at night
- (d) Use of notification slips for periodic examination to be furnished by dentist.
- (e) Report for repairs, rebases, etc., if necessary.

The first three items of personal hygiene, as above, may be given direct appeal, with reference to the parallel of maintenance of all kinds. Prophylactic notification system is equal with partial denture notification systems in the opportunity for prevention, as injuries which may result from broken clasps, occlusal rest or similar, cannot be foretold with accuracy.

46. CONCLUSION

Realizing with concern the lack of professional knowledge of the subject of partial restorations, and, to a certain extent, the lack of

real interest in the subject, the writer offers the following suggestions in conclusion.

1. Research of partial denture problems to be included in as many research programs as possible. From probably few causes are more teeth lost than at present from lack of this knowledge. Here follows a few suggested details:

(a) Design.

1. Checking hypothesis of design and classifications with 2¹⁶ or more cases.
2. Study of proper distribution of stresses of all kinds on teeth, mucosa, or combination support.
3. Clasp design to minimize capillarity and other disadvantageous factors.

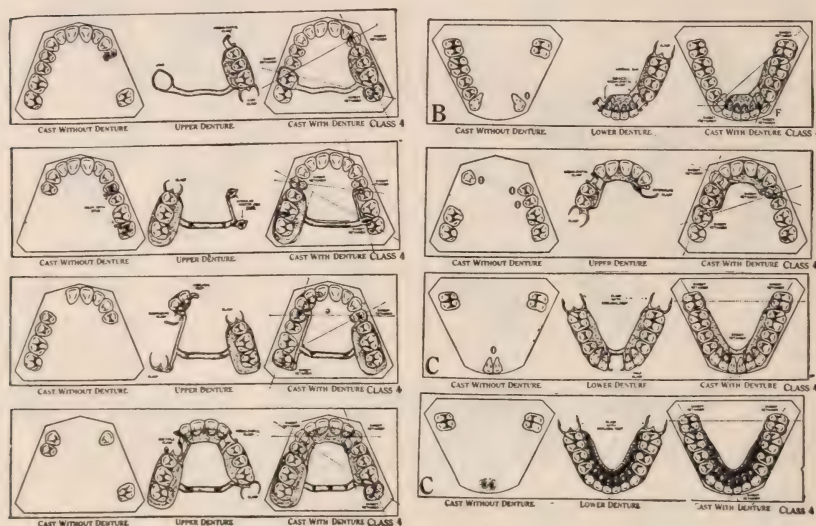


Fig. 16—A group of class 4 cases.

(b) Construction.

1. Simple and standardized impression technic.
2. Elimination of warpage and distortion by similar standardized instruction.
3. *Reduction of cost* and improvement of production methods.

(c) Installation, Maintenance, etc.

1. Periodic records of selected cases checking efficiency of designs in present use.

RADIO-THERAPEUTICS

Conducted by A. J. PACINI, M. D.

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CLINICAL DISTINCTION OF ULTRA VIOLET EQUIPMENT II

Furnished for clinical use, Ultra Violet equipment appears in two general types—air and water-cooled lamps. It was at first thought that the lamps thus furnished were simply convenient forms of apparatus for use generally over the body in the case of air-cooled lamps; and focally in the treatment of the various cavities in the case of the water-cooled lamps.

After becoming more familiar with the physical characteristics of the operation of mercury vapor arcs in quartz, and more conversant with the qualities of the issuing energy itself, there was found still greater distinction in the use of the air-cooled and water-cooled lamps which must be properly evaluated in terms of elementary physics.

Ultra Violet energy, like all energies, may be derived from and converted into other forms of energy. It is most practical to use the usual electric current supply for the original form of energy that is converted into Ultra Violet. The conversion takes place in the mercury arc and follows, quite generally, an important law of radiation known to the physicist as Wien's Displacement Law. Wien's Displacement Law says that in cases of temperature radiation, the wave length that is emitted from a source becomes shorter in proportion as the temperature increases. A simple proof of this law may be experienced by observing the operation of a resistance wire through which an electric current passes, as, for example, in the case of the ordinary electric heater. When the electric current begins to pass through the coil of the electric heater, one may detect heat long before there is any visible change in the color of the resistance wire. In a short time the wire acquires a dull red color and the amount of heat detected becomes greater. After a longer time the wire gets a brilliant red, and the heat more intense. Soon the wire becomes orange or even yellow, and the heat proportionally greater. As the heat becomes greater the wave length of the emitted energy becomes shorter.

This obtains to a considerable degree in the case of the mercury arc and since the brunt of the heat is borne particularly at the anodal spot in the burner, the modern form of Uviarc holds an infusible target of tungsten metal. This striking innovation, like the

tungsten target of the Coolidge tube, permits of a greater input of electrical energy into the tube with a consequent greater evolution of heat and therefore greater volume of Ultra Violet intensity.

It will be observed in the operation of the mercury arc that the light-giving column contracts more and more into a central axis in the tube in proportion as the temperature rises. This leaves a space between the light stream and the quartz wall of the burner; and, according to Professor Wood, of Johns Hopkins, by reason of

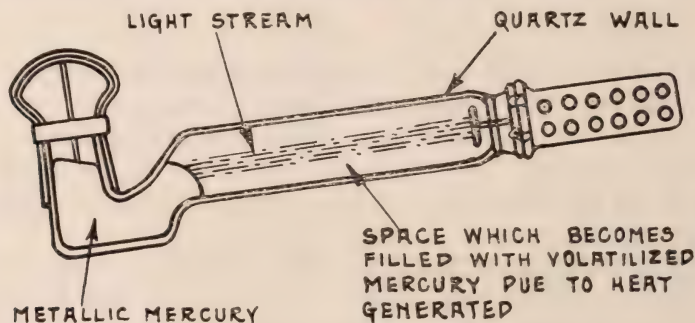


Fig. 1.

the intense heat generated, the space becomes more or less filled with the vapor of mercury. *Figure 1* is a diagrammatic section of the air-cooled burner and shows plainly the space which becomes filled with volatilized mercury due to the heat that is generated.

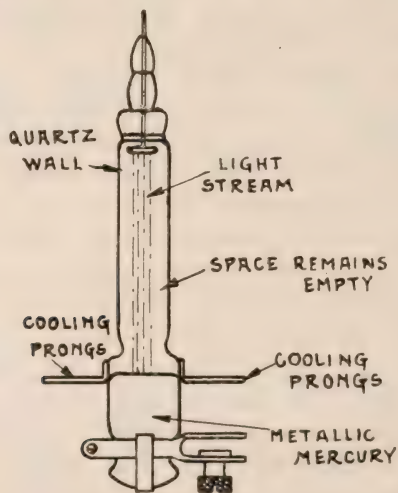


Fig. 2.

In the discussion appearing in the previous issue of the SUMMARY we learned the generalization, that any material interposed in the path of Ultra Violet tended to occlude the shortest wave lengths. This mercury vapor mantle which forms in the air-cooled burner, therefore, acts as a sort of filter which diminishes the intensity of

the shortest Ultra Violet wave lengths; and so the air-cooled lamp furnishes an Ultra Violet radiation that is dominantly long in wave lengths. As contrasted to the physics of the air-cooled burner, the water-cooled burner is provided with a cooling system. The effect of the cooling system is to condense the mercury vapor that forms in the vacuum space referred to. The condensation therefore removes any filtered material, leaving the space between the light stream and the quartz wall of the tube practically entirely empty. By evacuating this space of filtering material, the water cooling insures the emission of short Ultra Violet wave lengths (the wave lengths that are absorbed in part in the case of the air-cooled burner). This is illustrated in the diagram of *Fig. 2*.

From this consideration and by a diligent study of the diagrammatic representation, it is possible to understand the statement

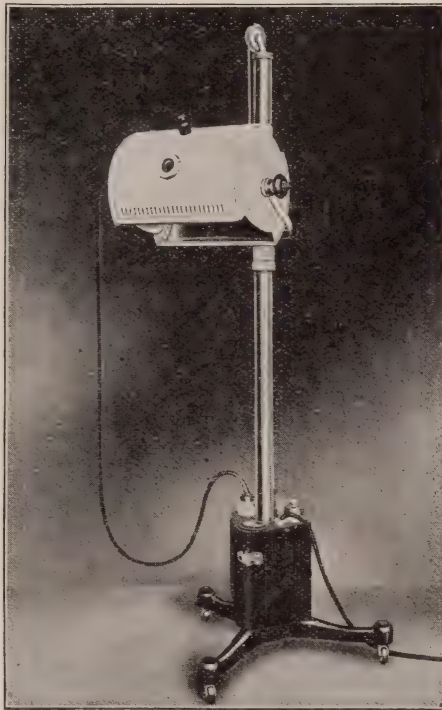


Fig. 3

generally made in connection with the modern Uviarc Ultra Violet equipment as follows:

"Using the mercury arc in quartz* tubes for the supply of Ultra Violet energy, the types of equipment in modern use are classed as air-cooled and water-cooled lamps.

"It has been generally taught that the air-cooled type is used for 'systemic' irradiation and the water-cooled type for 'focal' or cavity work.

*Pacini, A. J.: Ultra Violet Radiation, *Journal of Radiology*, Sept., 1922.

"A brief consideration of the fundamental physical principles involved will serve to make apparent a distinct differentiation between the two.

"When the electrical energy passes through the mercury vapor there is created a central stream of luminescence from which Ultra Violet energy is emitted. This transformation of energy, like many transformations, is accompanied with the evolution of much heat. The heat volatilizes the liquid mercury in the cathode reservoir and gives rise to a dense cloud of mercury vapor which envelopes the central luminescent beam, so that the rays must first be filtered through a mercury vapor mantle before passing the quartz in the air-cooled lamp. Remembering that the short Ultra Violet wave lengths are less penetrable than the longer ones (just the reverse to the conditions that obtain with X-ray energy), it is obvious that the air-cooled lamp furnishes a dominantly long wave length spectrum.

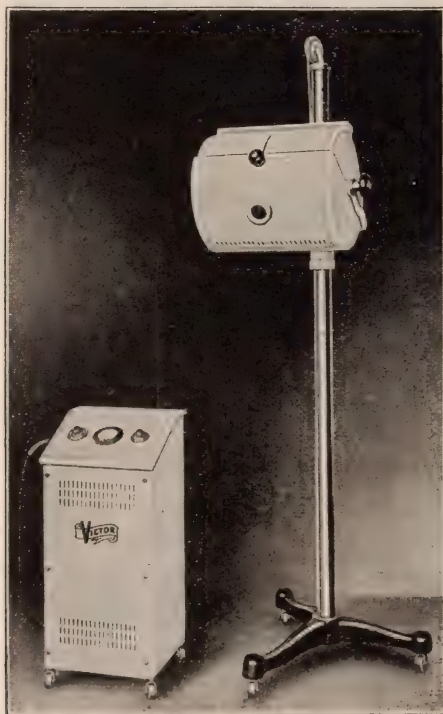


Fig. 4

"In the water-cooled type, the mercury mantle is quickly condensed, leaving the Ultra Violet energy free to issue from the quartz without previous filtration through mercury vapor, so the spectrum from this type of lamp is relatively richer in short wave lengths than the corresponding air-cooled lamp.

"On the basis of this physical difference, and from the findings of Ward, Russ, Ritter, Herschel, Becquerel, Draper, and others, the comparison of the two energies shows:

ULTRA VIOLET ENERGY
(Mercury Arc)

Air-cooled lamp

1. Near Ultra Violet intensity
2. Biologic (dominantly)
3. Chemically oxidizing
4. Relatively penetrating
5. Metabolic synergist

Water-cooled lamp

- Far Ultra Violet intensity
- Bactericidal (dominantly)
- Chemically reducing
- Relatively superficial
- Metabolic depressor.

"With this newer and biophysically-established concept of the qualities of the Ultra Violet regions, it is at once apparent that the empirically introduced standard of 'systemic' and 'focal'* lamps for the air-cooled and water-cooled types has made for pro-

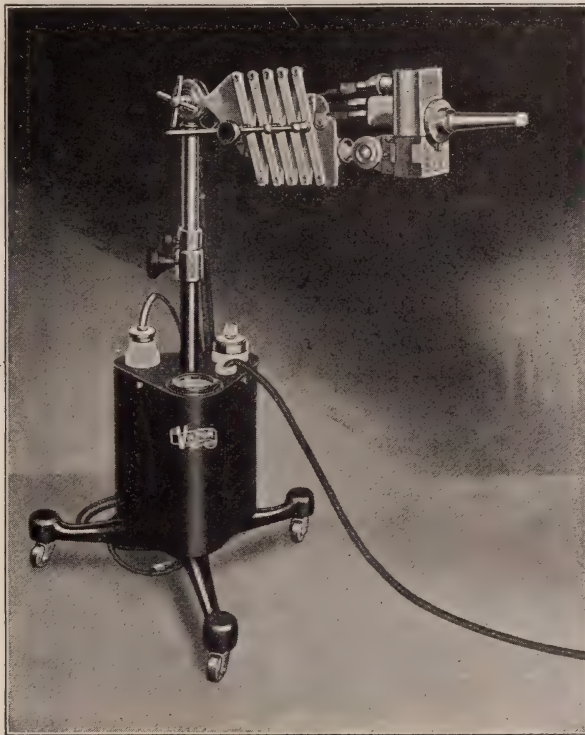


Fig. 5

found confusion and possibly injudicious application in the clinic. More properly, the lamps are biologic and bactericidal, and each one should be use systemically or focally, depending upon the pristine pathology of the lesion treated."

*The "Allgemeinbestrahlungen" and "Örtliche Bestrahlungen" of the Germans. For the newer concept of biologic and bactericidal lamps, I am indebted to Prof. R. W. Wood, of Johns Hopkins University, in whose laboratory the striking physical differences were studied; and to some officers in the office of the Surgeon General U. S. P. Health Service, who revised their technic according to the premises presented and have reported unofficially, successful therapy where failures were once observed.

Obviously, the newer studies reveal a greater distinction in the type of clinical equipment than that heretofore accepted; a distinction which is characterized by saying that in general the air-cooled lamp is best used for its biologic action as distinguished from the water-cooled lamp which serves better in the attack of bacterial infection.

From the viewpoint of dentistry, clinical interest would naturally center first in the use of Ultra Violet as a bactericidal agent, and this would point to the greater serviceability of the water-cooled type of lamp.

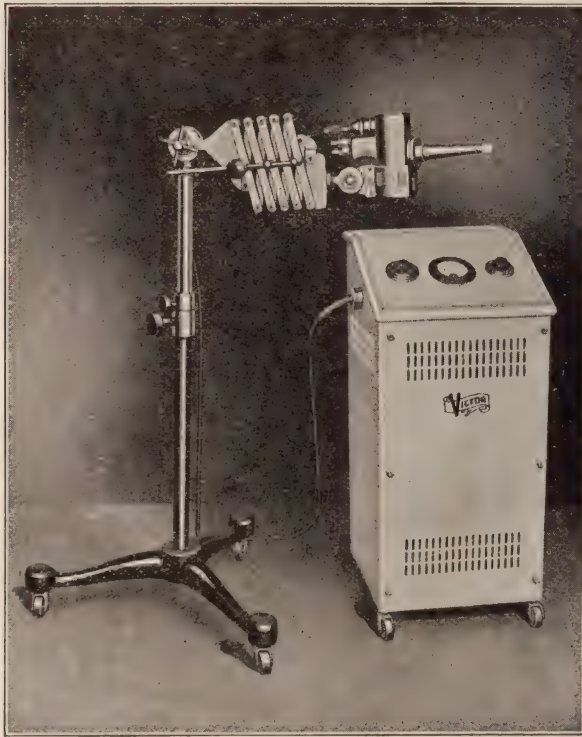


Fig. 6

The short wave lengths of Ultra Violet are bactericidal, an action which is now known to be due to a specific effect of the short or Far Ultra Violet radiation directly on the organism. This is an example, broadly, of selective effect. Short wave lengths of Ultra Violet are not penetrating for distances greater than a few microns in tissues. So that the bactericidal effect of Ultra Violet energy only can be established when the infected area is brought into contact with the light.

In the operation of the modern Uviarc quartz tube, it is essential that the current flow only in one direction, which means that the original supply of electricity must be direct current. In cases where the current is not direct, it is possible to provide a rectifying type

of burner; but these are not as efficient as the direct current burners. So that it is better to use some sort of converter that will modify the alternating current to the direct type. This is accomplished best through the use of a tungar rectifier, an instrument so well-known for its rather wide use in this type of work.

In addition to a direct current supply, there must be provided also a ballast resistance. Ballasting resistance is an expedient means for compensating the variations in the line supply that would interfere with the smooth operation of the burner.

In air-cooled lamps therefore the essential parts comprise the air-cooled Uviarc; a suitable housing; an adequate floor stand with



Fig. 7

counterbalance for the casing; a rheostat holding the ballast resistance. And in the case of the alternating supply of initial current, the rectifying device which is generally furnished in a separate unit holding at the same time the ballast resistance.

The air-cooled lamps are shown in *Figs. 3 and 4*. In *Fig. 3* the rheostat control for direct current and in *Fig. 4* the rectifying control for alternating current is shown.

As with the air-cooled, so with the water-cooled type, the ballasting resistance and the rectifier in the case of alternating current must be provided. In addition, the water-cooled lamp requires a

continuous flow of water which may be obtained from a faucet and is furnished in models some of which are presented.

Very recently there have been introduced forms of water-cooled equipment quite useful for clinical and cubital office practice. They are designated portable and mobile water-cooled units and are illustrated in *Figs. 8 and 9*.

These units, in addition to being provided with all of the essentials necessary for the correct operation of water-cooled burners, hold at the same time a self-contained water reservoir, so that by simple turning of the operating switch all of the mechanisms, including the water circulation pump, are at once placed in operation for clinical usage.

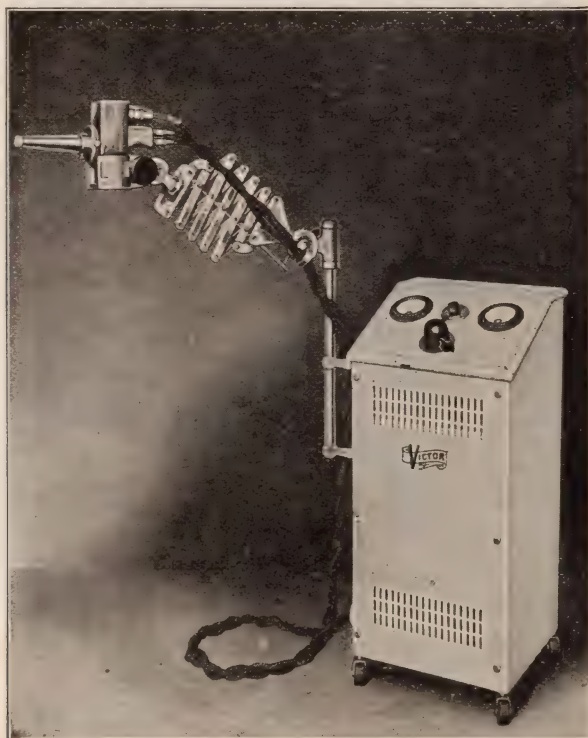


Fig. 8

SUMMARY

Ultra Violet equipment is furnished in two general types, designated water-cooled and air-cooled lamps.

According to the physical properties of the operation of the quartz burner, the energy issuing from each type of equipment is somewhat different in its biological effect, and this difference is summarized in the following table:

ULTRA VIOLET ENERGY

(Mercury Arc)

Air-cooled lamp

1. Near Ultra Violet intensity
2. Biologic (dominantly)
3. Chemically oxidizing
4. Relatively penetrating
5. Metabolic synergist

Water-cooled lamp

- Far Ultra Violet intensity
- Bactericidal (dominantly)
- Chemically reducing
- Relatively superficial
- Metabolic depressor.

In its most modern form the great efficiency of the direct current tube is realized, so that in those cases where the initial current supply is alternating instead of direct, engineers are agreed that the interposition of a rectifier like the tungar makes for increased efficiency over the use of the impractical and very costly alternating type of tubes.

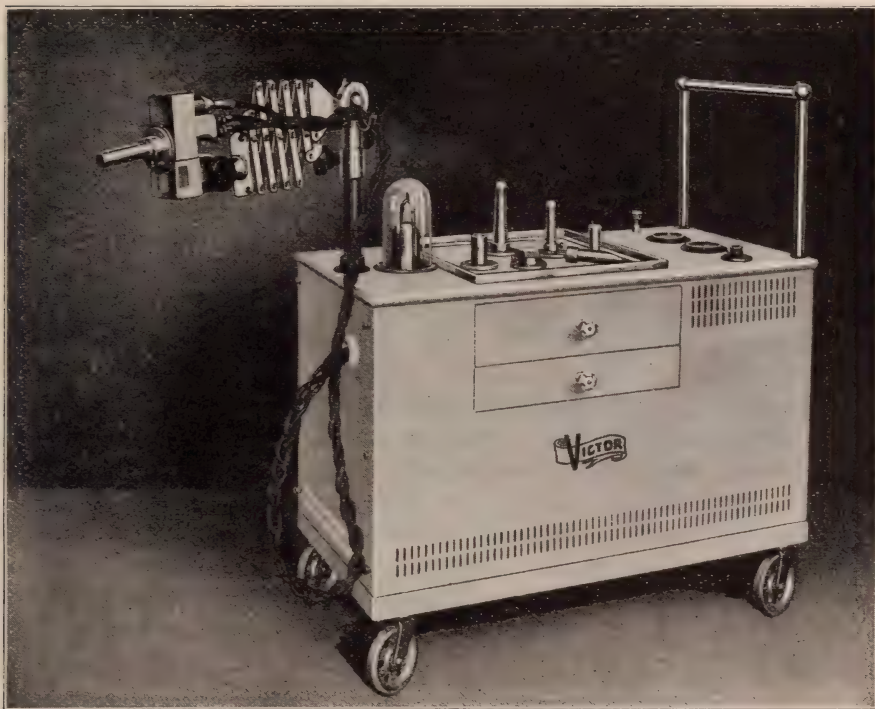


Fig. 9

The lamps are furnished in various models, each model lending itself best to certain forms of office or clinical usage.

REFERENCES

Luckiesh, physicist of the Nela Research Laboratory, conveniently divides the visible spectrum into near and Far Ultra Violet regions. The air-cooled equipment furnishes a dominant excess of Near Ultra Violet intensity; the water-cooled equipment furnishes a relative preponderance of Far Ultra Violet intensity.

Browning and Russ reported in the Proceedings of the Royal Society of London that Near Ultra Violet intensity has no marked germicidal action but pene-

trates much skin (biologic effect); and Far Ultra Violet intensity has marked germicidal action but is much less penetrable.

Ritter, Herschel and Becquerel, propounded a law that has been accepted since 1872, that long wave lengths (Near Ultra Violet intensity) exert an oxidizing action as opposed to the reducing action of short wave lengths (far Ultra Violet intensity).

Rideal and Taylor in their "Catalysis in Theory and Practice" show that reactions by radiant energy may be either accelerated or retarded. Near Ultra Violet intensity is an accelerator and acts as a metabolic synergist. Far Ultra Violet intensity is a retarder or metabolic depressor.

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SOMETHING ELSE ON VINCENT'S ANGINA

BY TRIM HOUSTON, CORSICANA, TEX.

(Written for THE DENTAL SUMMARY)

ABOUT A YEAR AGO we had the following experience: We had four children in quarantine with Vincent's angina. My diagnosis of Vincent's angina was confirmed by the findings of a competent pathologist. The orthodox local treatment was giving us indifferent results. A fifth child was added, who had every appearance of being a congenital syphilitic. On this account the physician ordered that syrup of iodid of iron be given him. The nurse in charge misunderstood orders and gave it to all five.

In less than a week the fifth child, and the other four who had been dragging along for from three to six weeks, were discharged, absolutely well.

Since then I have taken advantage of this line of treatment in several instances—in some using no local treatment whatever, in order to find out just how much it might be worth—always with gratifying results.

While not claiming that the syrup of iodid of iron is a specific for Vincent's angina, it would be well to keep it in mind and not hesitate to make use of it, when local treatment is slow in getting results.

PENETOLOGY

Conducted by WILLIAM A. LURIE, Oral Surgeon
1130 MAISON BLANCHE BUILDING
NEW ORLEANS, LA.

This new Department is to be devoted to X-ray Technic, Interpretation and Diagnosis, and it is the purpose to make it the most complete and helpful ever attempted by any dental magazine. To this end Contributions, Discussion and Questions are solicited, which should be addressed to Dr. Lurie as above.

RADIOLOGY OR PENETOLOGY

It is distinctly human to be attracted by the new and the unusual. Human interest pales however when novelty wears off or it becomes a little more difficult to discover the unusual.

Dr. Lyons, of Rochester, in his paper on the subject of Roentgenography calls particular attention to the necessity of a systematic and complete roentgenographic examination of the mouth. His paper tells of many unusual findings that are discovered during such examination, and which are considered as etiological factors in the cases in which they are discovered. Dr. Lyons too, calls attention to the fact that many conditions which predispose to malignancy can be discovered in time to prevent the malignant disease and that such timely discovery adds to life.

We have our sceptics and stiff-back technicians who will argue that there is a definite proportion of cases which never develop malignancy under the most favorable condition for its development; that many people with malignant conditions die of other causes and malignancy cannot be charged with the death, and they present any number of other arguments to detract from the idea that longevity is only possible because systemic irritants are removed, and life properly lived. In the face of any such arguments it is undeniably true as Dr. Lyons states that infected areas, necrotic areas, areas from which intoxication develops and malposition of teeth can be the cause of a large variety of general symptoms. Therefore every effort must be made to discover them, and one of the best means of making such discoveries is with the X-ray picture.

Again quoting Dr. Lyons, he states that every case of pyorrhea should have the benefit of a complete X-ray examination. Why stop at pyorrhea? Why stop at any condition which might bear the relation of a conjunction of oral and general symptoms?

The examination of the mouth, for any group of symptoms, either local or general, is as vital and important to the patient as any general physical examination for a disease of any other organ of the body. The organs of mastication with the appended salivary glands are the most important set of organs in the body. They must

function properly and must deliver nutriment in its proper form, to the digestive organs, to sustain life.

"Human interest pales when novelty wears off." The digestion of food is no novelty. The physiologico-chemical laboratory has proven that digestion of foodstuff takes place even in glass jars, and has succeeded in analyzing the processes by which digestion takes place. These experiments are most often produced with the normal amount of digestive ferments in a normal condition. It is only recently that attention is being directed to the oral cavity and its part in the production and delivery of some of the ferments necessary for proper and complete digestion. Curiosity is going to direct us further in learning the part that deviation from the normal in position and condition of all the teeth has upon the production of the ferments which really begin digestion. Our curiosity will not be satisfied until we see for ourselves what is causing trouble. We can see through only what is transparent and what is in our line of vision. The X-ray is a means of making structures more or less transparent. It permits us to study such tissues which lie deeper than on the surface. Our attention is being directed to the study of what is pictured as normal portrayals. With our human instinct as our guide, we pale of the normal portrayal because it is the usual, the more common finding. Because the normal is the more commonly found we neglect to make a searching examination. The ratio of findings is in favor of a discovery of the normal.

Why then take a picture of a tooth which is presented for filling? All the other teeth are normal. The tooth in question is in its proper position and looks otherwise normal. Why take a picture of a third molar which has apparently erupted perfectly and has a cavity from which the patient complains and one which could not be properly filled?

These questions arise daily and with them comes the question of added expense to which the patient would be subjected in taking pictures. As long as a person's health and length of life is governed or measured by the cost in dollars and cents, so long will that cost prevent the delivery of the best that there is in medicine and dentistry. There will be, however, those who are curious to find out and to do things properly even with a little less remuneration, so the pictures will be taken. What gives promise of being a small cavity in an otherwise normal tooth may be found to be a large cavity with a pulp long putrid and some periapical destruction of tissue or perhaps a bifurcated root or double root in place of a single one. A third molar in normal position may have about it any number of conditions which would complicate either the extraction or perhaps be the cause of the symptoms indicating extraction.

Perhaps what is being attempted in explanation can be more clearly brought out by illustrations and case histories. *Figures 1*

and 2 indicate that even after fairly perfect root-canal filling the apical area may not regenerate and even perhaps continue in destructive degeneration, infection and sinus formation.



Fig. 1

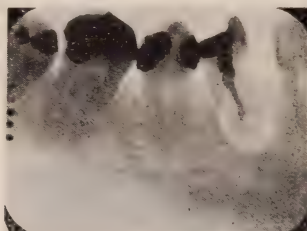


Fig. 2

The picturing of a tooth before it is filled and determining from the picture if such filling is warranted, would perhaps save much unnecessary dentistry. Our curiosity to learn the apical condition of a tooth before doing dental work has not yet reached the stage where we use the X-ray to advantage to determine just what operation is the best to perform. We still take the chance, because "it may never trouble any more" or perhaps on the basis of "what we are in ignorance of, does not affect us".



Fig. 3



Fig. 4

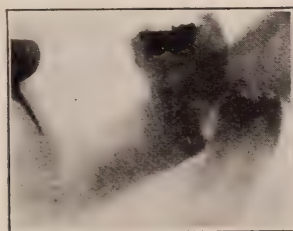


Fig. 5

In *Fig. 3* the patient could never wear a denture comfortably. The first molar was used as one anchorage and was crowned but still proved troublesome, so a picture was taken. The molar was removed, so was the unerupted malposed third molar. The denture was then reconstructed and worn without trouble.

In *Fig. 4* the neuralgia was not caused by pulp stones, as suspected, but by the malposed impacted and unerupted bicuspid. In *Fig. 5* there were some symptoms due to the impacted unerupted teeth about the third molar, for the decay was not sufficient to be the sole cause. The question is, how much benefit would this patient derive from the extraction of such a third molar, if the impacted and unerupted teeth are left behind? How could they be discovered without the picture?

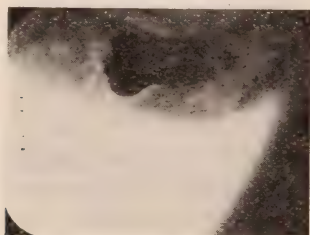


Fig. 6

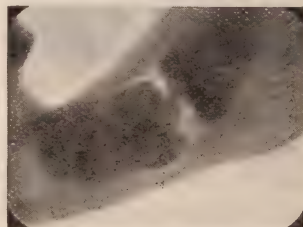


Fig. 7

The history of the case which *Fig. 6* pictures is interesting. Rheumatism developed several years after all teeth had been extracted. No focus of infection could be discovered. The upper denture was uncomfortable and appeared to cause undue pressure at one point. The X-ray revealed the cause of irritation at that point, and on removal of the unerupted bicuspid the rheumatism was relieved.

Figure 7 represents a case in the practice of Dr. F. W. Rounds. The symptoms were those of neuralgia and muscular spasm. These were relieved after the removal of these teeth.

The question which these cases seem to bring forth is: Can our curiosity in trying to determine the cause of trouble either local or systemic, lead us to take advantage of our best professional asset, the X-ray pictures? The X-ray picture of the teeth and jaws is a new field in which many discoveries can be made. The explanation of the causes of many baffling conditions can be found in X-rays of the mouth. We owe it to our professional standing to have enough pictures properly taken and to be able to explain them to our patient.

CORRESPONDENCE

STATE BOARD EXAMINATIONS

The letter printed in the September issue of THE DENTAL SUMMARY in regard to State Board Examinations is of interest to every ethical dentist practicing in this country.

I am not opposed to State Dental Boards, and am of the opinion that they are a necessity; but are they living up to the laws and regulations by which they were created? My conception of a State Dental Board is that they were created or appointed in each State for the purpose of keeping out undesirables and protecting the public. Are they doing this when they admit and allow the cheap quack advertiser to rob and impose on the public by putting their unsanitary tin-can crowns on every tooth they get a chance at, and plastering in their cheap amalgam fillings over decayed dentin by the millions every day of the year (Sunday included) all over the country?

I have been up against three State Dental Boards since graduating in 1912, got by all of them without failure, and to say that they are nerve racking, and brain wrecking is putting it mildly; but as they are, of what benefit are they either to us, to the State in which they are located, or to the public?

I took the Washington State Board Examination, which this dentist mentions, a year ago last June. There was one of the Painless Parkers (notorious Western advertisers) taking the examination, and he secured his certificate the same as I did. Now, either the State Board laws are unconstitutional and will not hold if put to the test, or the members of the boards have not the backbone to come out and say to the quack advertisers, "You either practice along ethical lines or your license in this State will be revoked".

I was in Centralia, Wash., some months ago. There was a County Fair being held. I heard a steam calliope coming down the street, and being curious to see what caused the commotion I investigated. I saw a dental chair rigged out on the rear of a Buick car, the calliope toward the front and printed in large red letters along the sides, "Painless Parker, Teeth Extracted Without Pain."

I left the college from which I graduated with a great deal of pride, feeling as all of us do, that I was a Doctor of Dental Surgery, but such as the above mentioned incident, and the quack advertisers have caused my pride to diminish a great many degrees.

At the present we are doing a lot of boasting about being on a par with the medical practitioner, but are we? Be honest with your-

self, when you answer this question. I would say no, not as a profession, nor will we ever be, as long as we allow the quack advertiser to cheapen us to the level we are as a profession today.

While attending a meeting of one of the State Dental Societies in one of the large cities of the Northwest, I was informed that the advertisers were doing about 75% of all the dental work in that city, Is not this so everywhere? How are the State Boards of today protecting the public? Is not every dentist who so desires, be he undesirable, of low moral character, advertiser or what not, practicing in some State in the Union? It seems to me that it is high time the State Dental Boards and Dental Societies, with the assistance of each individual dentist begin to clean house. A person is usually known by the company he keeps. You may call them out-laws or whatever you please, but to say to the other professions and the public, that they are not members of the profession, would be treating the truth rather roughly.

From my view, as I said in the beginning of this article, State Dental Boards were created for the purpose of keeping out from their own particular States, dentists who would be a menace to the peoples' health, thus protecting their health and well-being. Had they enforced these laws from the beginning it would have been an easy task, but considering the extent to which they have progressed at the present time, it will take the combined efforts of every State Dental Board, Society, organization and individual ethical dentist to clean up our front yard.

Most likely the first question to be asked will be: How can this be accomplished? The solution is easy: Give them a double dose of their own medicine—advertise—not in the manner of the cheap quack with his bold letters, but let the different dental societies and organizations use the columns of the best papers and magazines to give the people the information they are so eager for regarding their teeth, such as the medical profession are publishing. Some of this already has been done, principally in the East, but in a mild and limited way. "How to Keep Well," by Dr W. A. Evans, appearing in the *Spokesman Review*, as well as hundreds of others that are being read daily by millions.

At the present time there appears in one of the Hearst's Magazine articles written by Norman Hapgood, and others, attacking patent medicines and quack practitioners. Some will start to holler that this would be unethical, but are we not trying to reach the standard of the medical profession? Is it unethical for them? It is the uninformed that are filling the offices of the advertiser. Give them the truth about their teeth and the care of them and what they are getting when they patronize the advertising offices, and soon the advertiser and quacks will die a natural death for want of patients on which to practice.

Only a few years ago the papers and mails were flooded with literature of the quack doctor and patent medicines. This is practically a thing of the past. Today you seldom see anything of this kind. We can do the same by following the methods of those who put the quack MD's out of business. If half of the splendid articles hidden away in our dental journals had been given to the public, advertising offices would not be so numerous today.

Then and not until then, can we expect to gain the respect of the medical profession and public and reach the standard to which we are entitled. We will then be in a position to demand fees in some comparison to the medical profession, whereby we can take a post-graduate course, and keep up with the trend of times, pay the butcher and the baker and possibly lay away a few dollars for the rainy day and old age.

Under existing conditions it is useless for the average dentist to boast to the balance of the profession or kid himself into the belief that he is getting rich. It is a positive fact that the better class of barbers take in more clear cash per month and have more to show for their year's work, than the majority of dentists.

Something must be done, and will be done; the question is, are we going to sit idly by as if we were satisfied with our lot, and leave this job for the boys who come after us?

I would say, and I believe the majority of the profession will be with me, "Let the State Dental Boards enforce the laws for which they were created, giving us and the public the protection to which we are entitled, make the quack who is infringing on our rights and the public health be good, or revoke his license, and thus do away with the long tedious examinations".

Our college diploma issued by a reputable Dental College should be ample evidence that we are qualified to practice our profession wherever we desire without being compelled to pass almost impossible examinations when we desire to change our location from one state to another.

—Montana Dentist.

STATE BOARD EXAMINATIONS

Speaking of Dental State Boards brings to my memory the unpleasant feeling I experienced when I heard over the wire the quiet sympathetic voice of a friend of mine, "I am sorry, Rob. Too bad you didn't pass."

This was the first word I had heard from the California State Examinations which I had taken a month before. I was of course badly disappointed, for I thought there was no chance of "flunking", as I had carefully gone over each question and satisfied myself I had written passing papers.

Later I was told that the Secretary of the Board was pleased with my work but that I had failed to produce my diploma ten days before the examinations. I had mailed my diploma and he had in his possession statements from the Oregon Board and from the College of Portland showing I was a graduate and had passed the Oregon Board only five months before. Nevertheless, after sending a wire to the College of Portland and getting more evidence I was allowed to pay \$25.00 and take the examination again, which I did last May and passed satisfactorily. I will say, however, that I did my work with less care and in my own mind my papers were not as good as the previous ones in December. Nevertheless I now have my license to practice and am doing my best to serve the people. I would like to see others have the same chance to serve without needlessly spending time and money. What do you think about it, Brothers?

Yours truly,

Oakland, Cala.

Dr. O V. Robinson.

FILLING ROOT CANALS BY DIFFUSION

I had the privilege of reading the valuable paper by Dr. Harry B. Johnson on filling root canals by diffusion published in THE DENTAL SUMMARY for August 1922.

Allow me to state that I do not believe that diffusion may take place in such a short time in a medium so compact as dentin.

If, according to my technic, we use indirect diathermy, capilarity may be the factor for introducing any fluid substance or finely-subdivided metallic particles into the tubules, because the tubules' contents are not always disintegrated to the full extension of the tubules, some elastic organic matter filling the balance next to the interglobular space still remaining.

While using indirect diathermy, with induced high-frequency current, the tubules are dried out from the canal inward and disintegrated organic matter released from their hold upon their walls. At the same time physiologic organic matter contained in the balance of the tubules stretches out and expels the disintegrated particles which in their turn are carbonized by the small sparks jumping from the needle against the root-canal walls.

At this stage the tubules are thoroughly filled with normal organic matter stretched out on account of difference of thermal equilibrium. If we flood the canal with my preparation mentioned in my enclosed paper,

	FORMULA	GRAMS
Copper chlorid		.01
Sodium chlorid		25.
Zinc chlorid		10.
Aqua		1.

or with a solution similar to Callahan's, which I have been using for

more than 20 years before the tubules and their contents reassume their normal gauge and volume, the same process of normal shrinkage of the organic matter will draw the solution and fill the tubules and accessories. Any substance employed for the purpose of final filling of the tubules, accessories and even the canal will be highly oxidized by the ozone evolved during the electric application, and remain permanently in this condition.

You are entitled to use this letter for the benefit of researchers of root-canal work.

With my personal regards, I am,

Yours truly,

Este 33, Caracas-Venezuela

A. A. Nouel

TRIGEMINAL NEURALGIA

I am addressing this to Dr. Silverman having become very much interested in his excellent treatise on trigeminal neuralgia, in the February DENTAL SUMMARY. I am taking the liberty to give him a brief experience of my own with a case of this kind.

The patient is quite an old lady and the symptoms which she presented on coming to me over two years ago, after having sought relief from the physician in vain, were so typical as to leave no doubt as to the diagnosis. She was very wobbly and weak, in great agony, and had a blood pressure of somewhere around 250. (I am not accurate in this). When my finger touched the angle of the mouth she went into a fresh paroxysm. I made a mandibular injection of 1c.c. alcohol. I forget whether I used the novocain previously or simultaneously. This gave relief for about a year. She then returned and I made a similar injection. The effect was not quite so good but tided her over. She returned a week ago in worse shape than ever. She had not eaten for four days, had not slept, and her folks said she made signs instead of articulate speech. A few days before her appearance I just happened to read your article in the *Pacific Dental Gazette*. From this I immediately concluded that the buccal branch was at fault. I injected same with 1c.c. pure alcohol, combined with two "E" tablets, in just enough water to dissolve the tablets. (I did not know whether the tablets were sufficiently soluble in the alcohol, moreover, thought it might be best to sterilize the tablets in the boiling H_2O .) This injection gave almost instant relief. I have not heard from her since so do not know if it still holds good, but I believe it will. So I am grateful for your article.

Now one thing that might possibly interest you in an academic way. I happened on the following on page 818 of Fisher's "Edema and Nephritis":

"Fletcher was the first to convince me that a diagnosis of tri-facial 'neuralgia' never meant anything. Of course, some medical

men had suspected this in some cases, but most held then and some still hold, to a neuralgia 'sui generis'. Well, neuralgia means pain in a nerve, and is just as complete a diagnosis as headache or toothache.****The neuralgia is a symptom expressive of pathological change in the involved nerve, due to intoxication or a true inflammation, and many a one as it involves the nerve of the face is but the expression of an intoxication or an infection, traveling up the fifth nerve from a bad tooth."

Of thirteen cases of trifacial neuralgia which Fletcher studied, he relieved twelve by proper treatment of infections about the teeth. I like to compare with this record that of some of my surgical friends who have handled the same distressing condition in other ways. A popular method with them is to pull the fifth nerve out by the roots. In other words, the telephone bothers them, so they rip out the line. They have other ways also of handling the situation. Instead of recognizing the origin of the trouble and locating it (as is commonly the case, in the teeth) the surgeons kill the nerve, or paralyze it with alcohol.

This, doctor, in the light of your views on the etiology and treatment, naturally struck me very forcibly. I do not, of course, submit it as criticism, but only because we are all interested in any light that can be thrown on our special field of work, by anyone who carries any authority at all. I do not know what standing these men have, but thought you might possibly be somewhat interested in theories so diametrically opposed to your own.

W. A. Kerrison, D.D.S.,
Wilbur, Wash.

X-RAY NOMENCLATURE

Confusion of terms is evident at every turn in the practice and teachings of the subject of X-ray (roentgenography, radiography or as we have so often designated it, penetography). No later than in the October issue of the *Dental Cosmos*, so well known and well-versed an authority as Dr. C. Edmund Kells takes issue with Dr. Feldman with his verbology as used before the New York Society.

Dr. Feldman is accused of making the statements as follows: "shadow cast by the cyst," "shadow of the rarefied area," "shadow of the vacuity of bone." These statements Dr. Kells takes issue with and defends his criticism by alluding to the two following sentences: "The shadows of the SPACES between the trees," and, "The OPENINGS in the wall cast their shadows upon the ground".

It may be presumptuous of me to criticise the "father of dental X-ray", at least a pioneer of the type of Dr. Kells, for American dentistry and X-ray owes him much, but I do take issue with his non-constructive criticism.

We often have read from this same source that much that we see pictured does not exist. Newer authorities who have made the reading of SHADOWS their special province, say (and we are told that what we differentiate on the dental films are shadows), that nothing escapes being pictured by the roentgen-ray or X-ray, but that we lack the ability to interpret these shadows properly.

In taking issue with Dr. Kells and agreeing with Dr. Feldman in his several statements, I desire to point particularly to the fact that the picture which is studied is a record of the penetration of light through the area being pictured. Every portion of human tissue has a resistance value to X-ray penetration. This has been pointed out by Dr. Hines in his recent paper before the Tennessee State Dental Society, and in the department of X-ray (penetology) in THE DENTAL SUMMARY. Resistance to X-ray penetration is influenced by the amount of mineral salts in the tissue pictured. It is even influenced by the arrangement of the mineral salts. In this sense every area or portion of the pictured tissue is a shadow cast by that area and a register in plus or minus of resistance to light penetration.

If there were a common and comprehensive terminology for this branch of science it would not be necessary for men to take issue as is here recorded. The power of X-rays to penetrate what are otherwise opaque areas is their sole virtue in photography. By the reduction of salts as in photography, the degree of penetration of light waves is recorded as a shadow. The entire film area is a shadow, compounded of shadows of numerous smaller bodies or areas within the area studied. Each shadow is differentiated from the other by the variation in penetration each area has permitted. Thus a cyst within a given area is definitely outlined over a bone or tooth area or even the area of the antrum because of its lessened density, yet that area is an area of shadow. This is also true of rarefied areas or areas of vacuity of bone. Such areas are really comparable to the "spaces between trees" and "the openings in walls" which cast shadows. If this be not possible, may we ask if a bone whorl or an area of condensing osteitis could cast a shadow on a dental film? If spaces do not cast their shadow how can Dr. Kells explain the difference in the shadow of a root canal and pulp chamber under varying conditions from the healthy state to that just preceding its being filled? There undoubtedly is a difference in shadow; in the shadow of the wall mentioned by Dr. Kells the door if shut or ajar could not be differentiated. Shadows which would result from penetration of light would picture a difference in the coefficient of penetration between wood, brick and cement. Likewise the ordinary shadow of a tree does not differentiate between the trunk, limbs or leaves of that tree, yet that shadow made by light penetration would differentiate those various areas. Thus the picture of a dental X-ray, and let us call it a penetogram, regis-

ters the resistance to penetration which X-rays encounter. If the reading of the roentgenogram were in terms of penetration or resistance the so-called error of Dr. Feldman would not be so apparent.

The terminology used in THE DENTAL SUMMARY throughout this year, that based on penetration of light, was submitted to the committee on nomenclature, but not considered because of its not being descriptive of radiant energy. It never was intended as such; it was intended to describe the RESULTS of the penetration of those rays of light which we term X-rays. In the idea of light penetration, a cyst, rarefied area or a bone vacuity will cast a shadow because of the relativity of penetration due to an alteration of area or tissue density.

William A. Lurie.

Maison Blanche Bldg.
New Orleans, La.

OBITUARY

THOMAS STEELE

Founder and vice-president of The Columbus Dental Manufacturing Company died at his home in Columbus, Saturday, October 28th, 1922.

Mr. Steele was born in Thompsonville, Conn., on January 2nd, 1851. He was married January 28th, 1882, to Carrie L. Whitcomb of Fitchburg, Mass., who still survives. There were no children to this marriage.

Mr. Steele was widely known to the dental profession as the inventor of Steele's Interchangeable Tooth. His early years after leaving school were devoted to the finer branches of mechanics for which he prepared himself by serving two full apprenticeships, one under his own father, the other under the elder Mr. Crowell.

About the year 1900, he took up the study of interchangeability as applied to porcelain teeth. In 1903, he organized The Columbus Dental Manufacturing Company for the purpose of manufacturing his tooth, and manufacture was begun in 1904. He not only perfected this tooth but designed and supervised the building of every machine used in its manufacture.

Mr. Steele was of a gentle and loving nature, but very retiring in his disposition. His devotion to his work could not be appreciated by any except those who came into daily contact with him. Thorough in every detail of his work, always kind and thoughtful of his employees, in every one of whom he took a personal interest, he always received perfect co-operation in his daily tasks.

Mr. Steele was charitable not only in thoughts but in acts, and his helping hand will be greatly missed by many people in various walks of life.

Mr. Steele was a Knight Templar and a member of the Mystic Shrine. His Christian life was an exemplification of the teachings of Masonry.

His burial was at Jersey City, N. J.

NEW PUBLICATIONS

Index of the Periodical Dental Literature published in the English Language, including fifty-eight publications in England, Scotland, Canada, Australia, New Zealand and the United States, for the year 1921. A classified subject Index on the plan of the Dewey Decimal Classification. An alphabetical author Index. A list of Dental Books published during the same period. Compiled by Arthur D. Black, A. M., M.D., D.D.S., Sc. D., Dean Northwestern University Dental School. Published by the Dental Index Bureau under the direction of the American Institute of Dental Teachers and under the auspices of the National Dental Association. The Research Commission of the National Dental Association, British Dental Association, Canadian Dental Association, New Zealand Dental Association, Society of Dental Science of New South Wales, 1922. Price, United States and Canada, postpaid, \$2.00. To all foreign points \$2.50 postpaid.

This volume is the first of a proposed series of paper-bound annual volumes, which will be combined into a single cloth-bound volume each fifth year. The plan is as follows: For the years 1921, 1922, 1923, 1924 separate paper bound volumes will be published. When the type is set for the 1925 volume the type for the other four (1921 to 1924) will be included with it, and a cloth-bound five-year volume will be printed on exactly the same plan as the two five-year volumes, 1911-1915 and 1916-1920, already published.

Besides these annual volumes, another volume is now in preparation which is expected to cover the period from 1839 to 1880, and this will be followed by others to fill the gap from 1881 to 1910.

These annual volumes are uniform in arrangement and make up with the five-year volumes already published and serve the purpose of keeping one up-to-date regarding the recently published dental literature.

Orthodontic Impressions and Casts. By Herbert A Pullen, D. M. D., Professor of Orthodontia, Dental Department, University of Buffalo. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut St. Price \$1.50 net.

The author states that "This manual of instruction in the technic of making plaster casts of the teeth is intended for use both in the post-graduate schools of orthodontia, where the art of making esthetic plaster casts is especially taught in minute detail, and in under-graduate schools of dentistry, where accurate cast making has often been rather indifferently taught due to the lack of any standardization of methods".

The text and illustrations in this book, while following closely the technic in orthodontia, are arranged in such form as to simplify the work of the student by the description of the detail of the technic and illustrations in consecutive steps or sequence, with inclusion of time and energy-saving methods which make the work less tedious. And all of the various instruments and technical methods described in the text are also fully illustrated so that the student may the more easily learn the consecutive steps of each operation with the least necessity for personal demonstration.

The book contains ninety pages of text and eighty illustrations.

Right Food The Right Remedy. By Charles C. Froude, B.Sc. Published by George Shean, Kingston, N. Y.

The author in his preface states that this book is a simplified handbook of practical information on the subject of food, arranged for convenience of the physician, the patient, and the person who, being well, desires to remain so.

It tells simply, plainly and understandingly what foods are best to eat under all conditions—whether young or old, well or ill, in warm or cold weather, while doing sedentary work or heavy manual labor. The book presents the essential facts of this universally important subject, giving the vital principles concerning food and diet as gathered through years of study and research from the fields of scientific investigation and experiment, thus making it possible to obtain, easily and

quickly, a dependable food knowledge which will be of service throughout one's entire life, or that of the family.

The book also gives a practical philosophy of health—the reasons for health and the causes of disease—a knowledge which gives double defence against the demon Disease entering the home.

It is not a diet book of "don'ts", but a food book which shows how foods in their proper combination build health, and it presents a most practical method to attain and retain good health.

Rather than containing the unproven theories of a food faddist, this volume differs from many in that the author's extensive practice has afforded him the opportunity for testing and proving his rules.

The text follows closely the teachings of McCann, Tilden, Alsaker and other food authorities, is logically written, well arranged and gives all the information one could ask about the character of various foods, food combinations, how foods should be prepared, food lists, menus, etc. It also has a splendid index to guide one immediately to the subject desired.

Orders may be sent to The Defensive-Diet League of America, 2370 Glenwood Ave. Special price to members of the dental profession.

A Dictionary of Dental Science consisting of Words and Phrases used in Dental Literature and such words of the Collateral Sciences as Relate to the Art and Science of Dentistry, with their Pronunciation, Derivation and Definition. By L. Pierce Anthony, D.D.S., Associate Editor of the Dental Cosmos; Chairman of the Committee on Nomenclature of the American Dental Association. Illustrated. Published by Lea and Febiger, Philadelphia and New York. Price, net, \$4.50.

The author says that his aim has been to produce an up-to-date dental dictionary sufficiently full to meet the requirements of all classes of dental practitioners and students of dentistry. Only those words from the collateral sciences have been included with which it is felt the dentist and dental student should be familiar as relating definitely to his own specialty. Special consideration has been given to the matter of pronunciation, the author having employed the simple and easily comprehended plan of dividing the words into their natural syllabic divisions, with the acute accent mark to designate the accented syllable, thus eliminating the confusion so often attendant upon the phonetic method of pronunciation, yet indicating with accuracy the exact pronunciation of the words.

The derivative words from the Greek language have been transliterated to the Italic characters for the sake of the increasingly large class of students who are unfamiliar with the Greek characters.

It is not a work of an encyclopedic nature, the words being defined in as concise a manner as is consistent with clearness.

For years there has been a need for a good dental dictionary and Dr. Anthony has succeeded admirably in supplying what we have so long desired.

Dental and Oral Radiography, a text-book for students and Practitioners of Dentistry, by James David McCoy, M.S., D.D.S., F. A. C. D., Prof. of Orthodontia and Radiography, College of Dentistry, University of Southern California, Los Angeles, Calif. Third Edition. St. Louis: C. V. Mosby Company. Pub. 1922. Price, net, \$3.00.

While this work was originally written to meet the needs of students it is just as valuable to practitioners especially those who have not as yet given the subject the study it deserves. The nature of the X-ray and its discovery is the first subject treated. Then follows High Tension Electric Currents—Magnetism, Electromagnetic Induction, Induction Coils, High Frequency Coils, and Interrupterless transformers. Then the requisites of the dental X-ray laboratory are explained. Then the subject of Technic of Dental and Oral Radiography, the intra- and extra-oral methods and Proper Tube and Current Conditions, and the Correct Exposure and Development of X-ray Plates and Films. There is an interesting and instructive chapter on The Interpretation of Dental and Oral Radiograms. Then Indications for the Use of the X-ray in the Practice of Dentistry and Dangers of the X-ray and Methods of Protection, conclude the text.

The book contains about 200 pages of print, illustrated with 116 engravings, and is neatly printed and bound.

SOCIETY ANNOUNCEMENTS

MICHIGAN STATE DENTAL SOCIETY

Annual Convention, March 26 to 31, 1923—Cass Technical

High School—Grand River Ave. at Second Boulevard.

ADVANCE INFORMATION—ANNUAL CONVENTION, 1923

SEVEN stories in height—550 square feet of floor space.

FIVE passenger, and one freight elevator, each elevator having a capacity of sixty people.

AUDITORIUM with seating capacity of 3065—equipped with stage, drops, ghts opera chairs, moving picture machines, orchestra pit, dressing rooms, etc. Forced washed air ventilation under seats. Acoustic properties perfect.

ASSEMBLY ROOMS eight in number, equipped with comfortable desks.

CLASS ROOMS soundproof, eighty-five in number; equipped with desks, instructor's desk, black-board, gas, water, etc. Ideal for clinic rooms.

AMPHITHEATERS seating from 150 to 300 with the equipment of lecture rooms.

LABORATORIES—Chemical and Physical, Pathological, Bacteriological, Pharmaceutical, etc.,

STUDIOS—Art and industrial, equipped with ranges, sewing machines, etc.

LOCKERS—Individual steel lockers for each attendant and exhibitor.

SWIMMING POOLS—Showers, etc.

LOUNGE ROOMS—One on each floor for ladies and one for men.

NURSERY—For children of attendants.

DINING ROOM—Cafeteria service—food served at cost—seating capacity for 1000. Meals served noon and evening during convention for all attendants at cost.

EXHIBIT SPACE—Excellent facilities on first floor, adjoining auditorium.

ONE HALF DAY of convention devoted to EXHIBITS. No other program for that half-day. Space available Saturday afternoon, March 24th, and Sunday, March 25th, for placing of exhibits two days before convention. Exhibit open to *general public, Monday, March 26th* if exhibitor desires, *i.e.*, dentists who are not members of the Association.

EXHIBITORS attend general sessions of convention—attend dinners, banquets, etc.; in other words, are a part of convention.

BADGES—Dentists, dental assistants, dentists' wives, dental technicians and exhibitors to have separate, distinguishing badges, that demonstrator may know at a glance who he is speaking to.

SAMPLES—Coupons to be given each legal attendant, which when presented at booth will secure samples. This to prevent repeating by "sample hounds".

PUBLICITY—The States of Michigan, Ohio, Indiana, Illinois and the Province of Ontario will be circularized. All principal dental meetings in the State of Michigan will be visited personally by members of this committee, advising members of this meeting.

ADDED ATTRACTIONS

An indoor golf match. An exhibit of obsolete furniture, chairs, instruments.

Exhibit by the Michigan Bureau of Dentistry.

Exhibit by Michigan State Laboratories.

Exhibit by the Dental Department, Detroit Board of Health.

Exhibit by the Nurses Department, Detroit Board of Health.

OUTLINE OF PROGRAM

Programs addressed to—

1. Dentists
2. Nurses, hygienists, assistants
3. Dental technicians
4. Dentists' wives

Programs arranged for, members Michigan State Dental Society and all members American Dental Association, their wives, nurses, hygienists, assistants and technicians.

Members of the Canadian National Dental Association and all other foreign countries, their wives, nurses, hygienists, assistants and technicians.

DENTISTS' PROGRAM

The Detroit Dental Clinic Club will demonstrate the following subjects—Prosthodontia, Crown and Bridge work, Indirect Inlay, Porcelain, Surgery, Prophylaxis and possibly the subjects of X-ray Diagnosis and Root Canal Surgery. Essayists from outside this state will read papers on each of the subjects cliniced.

Essayists on subjects other than those cliniced will be selected by the Program Committee, such as—Mental Hygiene, Economics, Diseases of the Mouth Influenced by Radium Therapy, Dietetics, etc. Each essayist will clinic the subject of his paper.

A great number of general clinics will be in evidence.

The program Committee will have besides the essayists who clinic, a number of men from outside the state, who are internationally known clinicians.

GENERAL COMMENT

The four and one half days program will be one continuous and regular series of educational talks and clinics for the four different sections of this meeting. As much as possible, the essayist of one program will appear on each of the others. Any essayist who comes will have a message for each of the sections, which will be really worth while.

Each dentist in Michigan, Ohio, Illinois, Indiana and the Province of Ontario, will be reached with complete program and arrangements. They will be reached in other ways in order to impress on them the importance of these meeting dates.

The Detroit Dental Clinic Club will excell at this meeting and exceed anything yet put on by them.

Each noonday the attendants will hear a speaker of prominence.

Each dentist, wife, nurse, hygienist, assistant and technician in Michigan will be reached personally with programs, etc.

The essays will be short, snappy and will not be discussed.

TUESDAY MARCH 27TH

A. M. Essays on the subjects of Prosthodontia, Surgery and one other essay.

Noonday Speaker

- P. M. Demonstration by Detroit Dental Clinic Club on Prosthodontia and Surgery.

Evening General clinics by men in the State.

WEDNESDAY MARCH 28TH

- A. M. Clinics by essayists and other internationally known clinicians.

Noonday Speaker

- P. M. Exhibitors half day.

Evening Public meeting in auditorium (3065 seats). A nationally known public man for speaker.

THURSDAY MARCH 29TH

- A. M. Essays on the subjects, Inlay Technic, Prophylaxis and one other essay.

Noonday Speaker

- P. M. Demonstration by Detroit Dental Clinic Club on Indirect Inlays and Prophylaxis.

Evening Banquet in honor of the President-Elect of the American Dental Association.

Informal dance and indoor golf game.

FRIDAY MARCH 30TH

- A. M. Essays on the subjects of Crown and Bridge Work, Porcelain Crowns and one other essay.

Noonday Speaker.

- P. M. Demonstration by Detroit Dental Clinic Club on Crown and Bridge Work and Porcelain Crowns.

Evening General clinics by men in the State.

SATURDAY MARCH 31ST

- A. M. Probably demonstration of X-ray Diagnosis and Root Canal Surgery.

Each of the programs will be just as interesting for its section.

The arrangement of this program is of course, subject to change, but the outline is as intended.

The first floor will be occupied by exhibitors and registration.

The second by the dentists.

The third by the nurses, hygienists and assistants.

The fourth by the dental technicians.

The fifth by the dentist wives.

The Ladies Committee will be headed by Mrs. William R. Alvord who is president of the Michigan Federation of Women's Clubs, and whose experience in reference to program and entertainment will be of immense value to the meeting.

Alpha Omega Fraternity

The fifteenth annual convention of the Alpha Omega (Dental) Fraternity will be held in Philadelphia December 27, 28 and 29, 1922.

Northern Ohio

A RESOLUTION PASSED BY THE EXECUTIVE COUNCIL OF THE NORTHERN OHIO DENTAL ASSOCIATION AT ITS MEETING AT SANDUSKY ON NOVEMBER FOURTH, NINETEEN-TWENTY-TWO

Whereas, the American Dental Association holds its next annual session in Cleveland in September, 1923, and

Whereas, the Local Arrangements Committee of the American Dental Association has suggested to the Council of the Northern Ohio Dental Association that it would look with favor upon the postponement of the 1923 Northern Ohio Dental Association meeting, and

Whereas, we desire to co-operate with the Local Arrangements Committee of the American Dental Association in making this Ohio Session a marked success;

Therefore, be it resolved, that we, the Executive Council of the Northern Ohio Dental Association, limit the 66th Annual Session of the Northern Ohio Dental Association to an Executive Session only, on June 4th, 1923, at Hotel Statler, Cleveland, and we instruct the secretary to inform the officers of the Local Arrangements Committee of the American Dental Association of the above action.

Dr. L. E. Phelps, Publicity,
319 Spitzer Bldg., Toledo, Ohio.

E. S. Braithwaite,
Secretary, N. O. D. A.

The American Society of Orthodontists

The American Society of Orthodontists will hold its 22nd annual meeting in Chicago, at the Edgewater Beach Hotel, April 9th, 10th and 11th, 1923. A cordial invitation is extended to all those interested in Orthodontia to meet with us.

W. H. Ellis, *Secretary-Treasurer*

Minnesota State Dental Association

The fortieth annual meeting of the Minnesota State Dental Association will be held at the St. Paul Auditorium, St. Paul, Minn., February 6, 7, 8 and 9, 1923. The St. Paul Hotel will be the official headquarters for the meeting.

C. H. Turnquist, *Sec'y*.

Montana State Board

The Montana State Dental Board will hold its semi-annual examinations, the second Monday of January, 1923, at Helena, Montana.

Marshall E. Gates, D.D.S., *Secretary*
Helena, Montana.

The Tennessee State Dental Association

The fifty-sixth annual meeting of the Tennessee State Dental Association will be held in Nashville, Tennessee, May 2, 3, 4 and 5, 1923, with headquarters at The Hermitage Hotel. A clinical and scientific program of unusual interest is being arranged.

O. A. Oliver, *President*

Joe Minor, *Secretary*

Lambuth Bldg., Nashville, Tenn.

J. W. Winn, *Chairman of Program Committee*

Lambuth Bldg., Nashville, Tenn.

Kentucky State Dental Association

The next annual meeting of the Kentucky State Dental Association will be held in Louisville, Ky., April 16th, 17th, 18th and 19th, 1923; Seelbach Hotel as headquarters. A clinical program of unusual interest is being arranged.

E. C. Hume, *President*

Wm. M. Randall, *Secretary*

1035 S. Second St., Louisville, Ky.

Geo. H. Means, *Editor of Program and Master of Exhibits*

Cherokee Apts., Louisville, Ky.

Robert L. Sprau, *Chairman of Executive Committee.*

Michigan State Dental Society

The Michigan State Dental Society will hold its annual convention March 27th-31st, 1923 in Detroit.

For information write Bion R. East, 504 Fine Arts Bldg., Detroit, Michigan.

Bion R. East, *Chairman, Local Arrangements Committee,*
Michigan State Dental Society.

Dental Protective Association

The annual meeting of the Dental Protective Association of the United States will be held at the Palmer House, State and Monroe Streets, Chicago, on the third Monday of December, the 18th, at 4 p. m. sharp. The report of the officers will be given; a Board of Directors will be elected and such other business transactions as should come before the Association.

All members are urgently requested to be present.

By Order of Board of Directors,

J. G. Reid, *President*

D. M. Gallie, *Vice-Pres. & Treas.*

E. W. Elliot, *Secretary*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

The thinking world has finally awakened to the truth of the ancient proverb: "An ounce of prevention is worth a pound of cure"; at least begins to show some symptoms of waking up, since the cry begins to make itself heard: "Tell us what to do", in place of that futile and time-worn plea: "Give us something to TAKE".

"Taking something" never yet "cured" anything, while it has been an active contributing cause of an immense volume of tribute paid to Old General Debility, which has been "in at the finish" of hundreds of thousands of lives.

Most particularly is it true that the taking of drugs never yet has "cured" one single case of that terrible scourge that lies at the foundation, if not itself the cause, primary or inciting, of probably ninety per cent. of the so-called "diseases", (really symptoms of acidosis), that modern medicine is called upon to treat—CONSTIPATION; and no less is it true that constipation in the presence of a proper acid-alkalin diet, rich in mineral salts, is as impossible as it is for water to flow up-hill unaided.

We mean just that. Modified of course by mental and moral factors, shock, mechanical "accidents", and things like those, the condition of the human body, in health and disease, depends wholly and solely, completely and entirely upon one thing: the proper proportion, preparation and ingestion of our common foods.

"Some years ago Cannon brought out the fact that *acid contact* closes the pyloric ring. The stomach is bathed in *acids* above, and the pylorus is closed UNTIL THE ALKALI TOUCHES IT FROM BELOW, or until alkali is taken by mouth, or the acids are diluted by food or drink.

"Digestion above the pyloric ring is acid, but the first part of the duodenum is bathed by just as high acids, with an equal amount of pepsin. These are rapidly or gradually neutralized. Five ulcers occur in the first part of the duodenum above the common duct to one in the stomach, and yet *more than one-third* of all the cancers in man occur in the stomach; that is, in the *highest acid field of the body*. In the region of Brunner's glands in the duodenum, a high degree of alkalosis develops to neutralize the acids of the stomach. When the *acids become neutralized*, the pylorus opens to let some of its contents out. As a result, ULCERS DO NOT OCCUR LOWER DOWN.

"The *acidity must be overcome*, or nature will be grossly wasteful of her alkaline digestion below the common duct. The intestinal digestion, which is absolutely necessary, is

alkalin. Persons can get along without acids, and have very good digestion, but they would not necessarily be very comfortable."—C. H. Mayo, M. D., Rochester, Minn.

Many people are suffering from constipation who do not know it; who think because they have some sort of movement every day that they are "regular". That's one of the troubles caused by ignorance. Here are some of the facts: The man who eats three meals per day should have *THREE COMPLETE* evacuations every day. If he does not, within three days he will be carrying around with him seven to nine pounds of toxic substances. No need to name the ultimate result.

If you take the trouble to ask the druggist he will tell you that he sells more constipation remedies than of all others combined; and I tell you that cathartics, physics and purges are just about the most dangerous drugs a man can put into his stomach—and goodness knows they are all of them dangerous enough. Some very good authorities say that it is even better to be constipated than to take drugs to relieve that condition. They soften the stomach-muscles, inhibiting the necessary peristaltic action; they draw the water from the tissues, together with the necessary mineral salts in solution.

It doesn't matter much just what their action is. DON'T take 'em. Instead—eat correctly. Whole wheat in breads and porridge, whole corn-meal in the same way, with WHOLE cane syrup, maple syrup, or honey—NOT AN ATOM of refined white sugar. Old-fashioned brown sugar is fine. All of the alkaline foods, particularly raw cabbage; little or no meat; raisins, unsulphured figs, and other dried fruits, citrus fruits, apples, milk, etc. There are plenty of foods that do not produce that acid stomach condition to which Mayo attributes so many and such grave troubles.

Long and chronic sufferers from constipation can very greatly aid the action of foods by taking bending exercises for five minutes each day until the foods have time to correct the acid condition. Stand erect; hands on hips; bend at the waist as far forward and backward as possible. Hands interlocked at back of head, repeat the bending movements; also bend from side to side. These movements may be made as well while lying flat on the back. In that position, raise the legs, first singly and then together, straight up over the head; then swing them both together from side to side, bending at the waist. Learn to com-



Watch your Clock!

—he's a sly old codger, and is working against you until you make him work for you.

TIME is the stuff of which life is made. It is also the stuff that makes up the bulk of what you, as a dentist, have to sell.

Nothing can be so wasteful of time as teeth that cannot be articulated without extensive grinding and re-forming.

When you are alive to the importance of Time and are striving to make the old clock work for you it is well nigh maddening to find the minutes slipping by while you strive to articulate teeth that were made without any knowledge of, or provision for, articulation.

Trubyte

—the Teeth that save you Time

In addition to facility in articulation you naturally want the dentures you construct to "look natural." Trubyte dentures have that individuality which all patients and all dentists desire, because the anteriors are offered in forms and sizes which harmonize with facial outlines and contours.

As we have said before, "Whether you set Trubyte Teeth on a door hinge, occlude them on a plane-line articulator or arrange them according to the most approved technic on a scientifically correct articulator, capable of reproducing every movement of the mandible, Trubyte Teeth will always give better results than any other artificial teeth made *when used under like conditions*," and they will meet this claim with less labor on your part.

Inferior teeth are expensive to you in one of two ways—you either spend a great deal of time regrinding them for articulation or you simply occlude them and "let them go at that." Either way you lose.

RESTORATIONS  THAT RESTORE

Your Dealer or Direct

The DENTISTS' SUPPLY COMPANY

220 West 42nd Street

New York City

press the stomach by drawing in the muscles, standing or sitting. Begin by doing it ten times; increase to a hundred. These exercises are particularly beneficial to shut-ins.

Common table salt is one of the worst dietary offenders. It has an affinity for iodine, which it draws from the blood and carries out of the body when excreted. Inland salt, those in common use, are iodine-free. Sea-salt contains it—but our fastidious housewives will not use it because of its color.

On October 26, I had the pleasure of addressing the Holmes Dental Club of Grand Rapids, on Dental Economics. Had a most enjoyable evening with a room full of royal good fellows. That my work was not altogether unacceptable is evidenced by the fact that I am to "play a return engagement" for them on December 1, this time speaking on Diet, a subject everywhere recognized as of prime importance, particularly as a factor in preventive dentistry and in the treatment of so-called mouth diseases, only a convenient name for one of the many symptoms of acidosis.

On November 16, at the William Penn Hotel, Pittsburg, I addressed the Odontological Society of Western Pennsylvania, on the subject: "Diet, with Relation to Health, Comfort and Efficiency," and found a most responsive audience. The convention was largely attended, and is declared to be one of the best ever held. It certainly should have been, with such a tireless worker as Dr. Leslie Waddill at the head of arrangements generally. Many members of the D.-D.L. were added to the roster, and more coming every day.

I hope to meet many friends at Cincinnati early in December. The League is to put on an exhibit, which we hope to make interesting.

Evansville, December 14-15; New Orleans, February 22-23-24, Wheeling, May 21-22-23, and a few smaller ones in between, are on my slate at present. If wanted elsewhere, arrangements should be made as early as possible.

Dr. T. N. Caldwell, Saskatchewan, has converted his automobile into a dental ambulance, in which he lives, moves and practices his profession among those who sorely need such services in the outlying districts of his province. There is plenty of room for this kind of service, and many men are adapted to it.

Dr. Howard Raper is spreading his doctrine that "An aching tooth is a sick tooth, and sick teeth never get well." He laments the recent extraction-fad, but says that the result of the reaction from it is as bad, since now many dentists are trying to keep 'em all in, no matter what their condition. He says that the teeth cost their wearers about all they are worth in one of three ways: Vigilance in preventing decay, modern dental

surgery, or ill health as the result of nerve to

Dr. M. B. Rudd, president Virginia Dental Society, stressed the increasing scarcity of dentists in his address before the State meeting October 18, and advocated the establishment of a state-supported college at Richmond. The shortage is real enough, and some remedy must be found. I never have been very enthusiastic about the lengthened college term, unmodified in some way, which, I believe, owes its inception to the creative mind of some dentist of the Old Dominion.

Dr. A. P. Gordy, Columbus, Ga., has won international fame by his work on abnormalities and deformities of the face as the result of mal-occlusion. A reprint of a paper read by him before the recent meeting of the Georgia society was reprinted for general distribution at the meeting of the National Health convention at Portland, Oregon, during the week of October 29. It is regarded as a classic that should be in the hands of every dentist.

Of 204 employees recently examined in a big Milwaukee industry, only 74 were found physically fit for their work. Of the rest 66 had bad eyes, 13 poor teeth, 31 enlarged tonsils, 11 high blood-pressure, two heart trouble. Some of the others required immediate surgical operations.

Marquette University is now occupying its new and perfectly-equipped building in the heart of Milwaukee. Twenty thousand patients can be handled in the new infirmary.

With the completion of the new two hundred thousand-dollar addition to the dental building, Michigan's dental college at Ann Arbor ranks with the best and biggest. Two hundred chairs and all necessary equipment are included in the new clinic, as is also a large amphitheater for lectures, etc.

DENTAL SOCIETY BRIEFS

Warsaw, Ind., Oct. 31.—Officers have been elected by the Kiscusko Dental Society as follows: President, Charles Wagner, of Warsaw; vice-president, E. F. Van Osdol, of Warsaw; secretary and treasurer, Hugh Snyder.

Defiance, Ohio, Oct. 10.—Officers of the Maumee Valley Dental Society were chosen today as follows: President, R. C. Cameron, Defiance; vice-president, O. S. Applegate, Hicksville; recording secretary, W. W. Connelley, Liberty Center; corresponding secretary, C. W. Davis, Napoleon; and treasurer, J. A. Benner, Defiance. The next convention will be held in Archbold, June 1923.

Newark, Ohio, Oct. 13.—The W. D. Miller Dental Society today elected the following officers: President, C. L. Wyeth, of Newark; vice-president, Wm. B. Grossman, of Mt. Vernon; secretary, E. V. Prior, of Newark; treasurer, C. W. Reelhorn, of Pataskala.

IPANA

TOOTH PASTE

Heals Bleeding Gums

You will agree with the verdict of thousands

—that IPANA cleans and polishes the teeth thoroughly and without harm.

—that IPANA, because of its Zitrato content, corrects soft and spongy gums and heals bleeding gums.

—that IPANA has a smooth snappy and delightful flavor—a treat to children and a pleasure to grown-ups.

*You and your patients
should know and use
IPANA.*

A Professional sample awaits your card.

BRISTOL-MYERS CO.

48 Rector Street

New York City

Makers of SAL HEPATICA



Fremont, Ohio, Oct. 18.—Following officers were elected at the annual meeting of the North Central Ohio Society today: President, J. K. Douglas, Sandusky; president-elect, P. A. Gouls, Gibsonburg; vice-president, R. A. Weckerson, Sandusky; secretary, R. A. McKee, Sandusky; treasurer, L. F. Myer, Sandusky, executive committee, M. A. Gephert, Huron.

DEATHS

At New Orleans, La., October 14, Dr. Andrew G. Friedrichs, aged 65. It was mainly through his efforts that the N. O. college of dentistry was absorbed by Tulane university in 1907, when he became the first Dean of the new school. He was an owner and associate editor of the N. O. Medical and Surgical Journal, and contributed many able articles to the literature of the two professions. He was president of the N. O. Odontological society, of various other dental

Classified Advertisements under this heading, \$2.00 each for 60 words or less; additional space 2 cents per word, single insertion; three insertions or more special rate on application.

QUALITY PRINTING—1000 envelopes, noteheads, bill-heads or business cards, \$2.75 postpaid. Hammermill Bond Cabinets containing 260 letterheads and 250 envelopes of Ripple Finish Hammermill Bond each in a separate compartment and printed to your order, \$5.00 postpaid. Get our price on anything you need in the printing line. We do "Better Printing for Less Money". The Anderson Press, Beacon, N. Y. 1210-P

FOR SALE—Because of physical disability, prominent dentist in city of 6500 desires to dispose of his entire dental equipment carrying with it lease to best office location in the city. Office fully equipped with very best of everything needed and will sell at great sacrifice. Excellent opportunity for dentist seeking new location. Write Northwestern National Bank, Livingston, Montana. 1220-P

DENTIST WANTED—Good location for Dentist. New Rooms in new building, specially designed for Dental Parlor, in a city of 16,000 people, and only three Dentists at present, Rent reasonable, Gas, Heat and Water furnished. In care of Dental Summary. 1240-P

FOR SALE—Dental Office, modern two—chair, ethical practice, established 20 years, every modern equipment Account of health, must go to California. Price \$1000. No reasonable offer refused. Answer quick. Dr. O. M. Harper, Forest, Ohio. 1230-C

Sal Hepatica

**Materially Aids
Local Treatment**

IN

PYORRHEA

Samples on Request

**Bristol-Myers Co.
NEW YORK**



For the dentist who wishes to save Pulp— PULP-LIFE supplies the means

Today exposed pulps need not be sacrificed. At one time they could not be saved. Later, dental progress made the saving possible but the task was a tedious one.

Today, Pulp-Life makes results more certain. It does its work quickly between the patient's visits. Pulp-Life saves pulps and in the doing, it saves time and pain.

Full directions accompany each package. If you prefer to go over the directions first, we will gladly send a copy.

DeSanno & Hoskins, Inc.
PHILADELPHIA

ALSO MANUFACTURERS OF DENTAL
HYPODERMIC EQUIPMENT, LIGHT-
NING DISKS AND STRIPS, NUK-
LORENE AND SPECIALTIES.

and medical societies, and was a delegate to the international medical congress that met in Mexico City last year. The profession will miss the work of Dr. Friederich.

At Denver, Colo., August 20, Dr. Clem Wilgus, of heart disease.

At Denver, Colo., October 15, Dr. E. Francis Cross, of heart disease.

At Leonardsville, N. Y., October 20, Dr. Walter Bailey.

At Monmouth, Ill., October 23, Dr. Fred H. McIntosh, aged 66.

At New York City, November 8, Dr. Leon C. Marden, aged 48.

At Appleton, Wis., November 6, Dr. John H. O'Connell, 30.

At Brooklyn, N. Y. November 10, Dr. Eben L. Nichols, 65.

At Berkley, Calif., October 6, Dr. E. H. Morrison, 47.

At Davenport, Iowa, October 10, Dr. Howard Lacey Letts.

At Sparta, Mich., October 24, Dr. A. J. Stamp, 41.

At Philadelphia, Pa., October 23, Dr. Samuel Brown Patchell, 47.

At Sayre, Pa., November 1, Dr. Fred W. Thayer was killed in an auto accident, aged 29.

At Athens, Ga., October 24, Dr. L. D. Loughridge, 34.

At Atlanta, Ga., October 10, Dr. Rufus R. Hightower, 30.

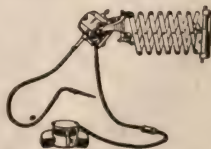
At Belleville, Ill., October 20, Dr. Alexander S. Halstead, 67.

At Richmond Hill, Brooklyn, N. Y., October 25, Dr. Richard Davenport Quaile, 51.

CORRECTION

In both October and November issues of THE SUMMARY, an error was made by which the price of the Thwaites X-Ray Unit appeared as \$595 instead of \$565, which it should be. We apologize for the error and hope that no injury has resulted.

ALL-CORD
TYPES
\$125



CABLE
TYPES
\$120

DIRECT OR FROM YOUR DEALER
CONVENIENT TERMS
CATALOGUE ON REQUEST

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